U.S. Department
of Transportation
Federal Aviation
Administration

Advisory Circular

Subject: General Guidance and Specifications for Aeronautical Surveys: Airport Survey Data Collection and Geographic Information System Standards (Volume C)

Date: DRAFT **AC No:** 150/53XX-XX
Initiated by: AAS-100

1. Purpose of this Advisory Circular (AC).

This AC provides the specifications for the collection of airport survey data through field and office methodologies in support of aeronautical information and airport engineering surveys. It also explains how to submit the data to the Federal Aviation Administration (FAA) for National Geodetic Survey (NGS) for approval. The primary purpose of these general guidelines and specifications is to list the requirements for aeronautical surveys conducted at airports in support of the Federal Aviation Administration (FAA) Airport Surveying–GIS Program. The FAA's Office of Airport Safety and Standards (AAS-1) administers this program. The surveys covered in this document provide critical information to the operation and safety of the National Airspace System (NAS) and are classified as critical by the International Civil Aviation Organization (ICAO). ICAO defines data as critical when "there is a high probability when using corrupted critical data that the continued safe flight and landing of an aircraft would be severely at risk with the potential for catastrophe." The information furnished under these standards include runway and stopway data, navigational aid (NAVAID) data, obstruction data, and data on various airport features, including taxiways, aprons, and landmark features. Most of this information is source data, which is acquired by field survey and/or remote sensing methods.

2. Application.

FAA and the NGS Aeronautical Survey Program (ASP) recommend the guidance and specifications in this AC for all airport projects. This AC describes an acceptable means, but not the only means, of collecting and submitting airport survey and Geographic Information System (GIS) data in support of aeronautical information surveys. Airport projects receiving Federal grant-in-aid assistance must use these standards. At certificated airports, the guidance and specifications may be used to satisfy specific requirements of Title 14, Code of Federal Regulations (CFR), Part 139, Certification of Airports.

David L. Bennett
Director, Office of Airport Safety and Standards

This page intentionally blank

TABLE OF CONTENTS

PART 1. GENERAL INFORMATION AND SPECIFICATIONS

CHAPTER 1. INTRODUCTION

This information is used to develop instrument approach and departure procedures, to certify airports for certain types of operations, to determine maximum takeoff weights, to update aeronautical publications, to provide geodetic control for engineering projects, to assist in airport planning and land use studies, and for other miscellaneous activities.

FAA and the National Geodetic Survey (NGS) developed these specifications for surveys at airports in support of the FAA Airport Surveying–GIS Program. These requirements and standards must be complied with, without deviation, until amended by formal FAA/NGS specification action.
Refer all questions about the interpretation and use of these standards to the Manager, Airport Engineering Division (AAS-100), Office of Airport Safety and Standards, Federal Aviation Administration, Washington, DC 20591.

CHAPTER 2. ADMINISTRATION

2-1. SPECIFICATIONS

This document provides general specifications, standards, and guidelines for conducting airport surveys. FAA and NGS developed these specifications for capturing the data used in selected U.S. Government aeronautical data and related products. In addition, the contractor may be issued a Statement of Work (SOW) in the contract agreement for each airport. The SOW will provide detailed and often unique survey information about the individual airport survey requirements. The SOW will take precedence over these General Specifications where they differ. However, the requirements for reporting deviations, unusual circumstances, etc. described in the following paragraphs apply to both the General Specifications and to the SOW.

2-2. CONVENTIONS

The following conventions have been adopted for these guidelines and specifications.

- The verbs “will” and “must” mean compliance is mandatory.
- The verb “should” implies that compliance is strongly recommended but not required.
- The contraction “N/A” means not applicable.
- The term “position” means horizontal position (latitude and longitude) unless specified otherwise.
- The term “elevation” means the distance of a point above a specified datum, measured along the vertical direction of gravity.
- The term “vertical” refers to the direction in which the force of gravity acts. The term “height” means the distance, measured along a perpendicular, between a point and a datum (refer to Part 1, Chapter 3, National Spatial Reference System).
- The term “observation” means the survey observations resulting in a position and/or elevation for the survey mark in question, whether it is pre-existing or newly set.

- The term “set” means physically constructed. Use the U.S. Survey Foot (3.280833333… feet = 1 meter) for any length conversions.
- “Airport Authority” refers to the administrators at an airport awarding the contract or their designated representatives.

2-3. CONTRACTOR GENERAL REQUIREMENTS

The contractor will provide all labor, equipment, supplies, material, and transportation to produce and deliver data and related products as required under these General Specifications. The contractor will be responsible for ensuring that all employees (including sub-contractors) meet all airport security requirements and that employees follow any other Airport Authority requirements, including making arrangements for escorts, radios, and training.

2-4. U.S. GOVERNMENT GENERAL REQUIREMENTS

The Government will provide the contractor with the following:

2-4-1. Receipt Acknowledgement

NGS Aeronautical Survey Program (ASP) will acknowledge receipt of both the Survey and Quality Control Plan (refer to Part 1, Chapter 1, paragraph 5) and the Final Project Report within 2 working days. This acknowledgment, typically via an e-mail from NGS ASP to the contractor and FAA Airport Surveying–GIS Program Manager, will also signify the start of the NGS ASP review.

2-4-2. Survey and Quality Control Plan Review

NGS ASP will provide the contractor and FAA Airport Surveying–GIS Program Manager with an approval or comment letter, via email, as soon as possible, normally within 5 working days. If the NGS ASP approves the plan, the contractor may then perform the airport survey. If the plan is rejected, the contractor must make corrections and resubmit the plan.

2-4-3. Final Report

NGS ASP will perform a quality assurance assessment of the submitted data, review the Final Project Report, and complete a final written report. The report will include the findings of a remotely sensed analysis and list any discrepancies discovered related to these specifications. NGS ASP will deliver the final report electronically to the Airport Authority and FAA within 10 working days. FAA will determine the course of action following the receipt of this report.

2-4-4. Aeronautical Data Collection and Analysis Tool (ADCAT)

The contractor will download the latest version of the ADCAT software from the FAA Airport Surveying–GIS Program. This software is designed to standardize field survey data collection and compile standardized output for delivery to FAA. The software will allow the user to dynamically analyze obstacles relative to the specified Obstruction Identification Surfaces (OIS)—for example, CFR Part 77, The software will provide the surveyor the ability to use functions in the surface model library and provide tools that will provide analysis information to ensure that the minimum requirements have been met.

2-5. MODIFICATIONS

The contractor must submit all requests for modifications in writing to the FAA Airport Surveying–GIS Program Manager and airport authority as soon as the contractor becomes aware of them and no later than 1 week prior to the Task Order due date.

2-6. UNUSUAL CIRCUMSTANCES

The contractor will notify the FAA Airport Surveying–GIS Program Manager of any unusual circumstances occurring during the performance of these General Specifications that might affect the deliverables or their quality. The Airport Surveying–GIS Program Manager will then contact and/or consult with the NGS POC and Airport Authority about these circumstances. Any deviation, except those specified in the SOW, must be noted.

2-7. MAINTENANCE AND CALIBRATION

All surveying equipment used will have maintenance logs showing routine preventive maintenance and repairs. The Final Project Report will include equipment model and serial numbers and Electronic Distance Measuring Instrument (EDMI) calibrations. If a hand–held EDMI is used, its distance-measuring accuracy will be compared to a distance measured with a calibrated EDMI and the results also reported in the Final Project Report.

2-8. REPORTS

Thorough reporting is required. The contractor must submit a Survey and Quality Control Plan prior to beginning any fieldwork (refer to Part 1, Chapter 5, Survey and Quality Control Plan) and a Final Project Report (refer to the individual “survey type” sections for more details) to the FAA Airport Surveying–GIS Program Manager and the NGS Point of Contact (POC). The prime contractor’s firm name must be included on all reports.

2-8-1. Project Status Report

In addition to the two reports listed above, the contractor must submit a project status report via email to the FAA Airport Surveying-GIS program Manager and NGS POC every Monday afternoon by 2:00 P.M. Eastern Time, from the date of the Task Order until the work is completed. These reports must include the percentage complete for each of the major portions of the work, the status of ongoing work (with expected completion dates), when work is completed (with dates completed), and any unusual circumstances and/or deviations from these General Specifications. Status reports should be brief and contain the current information in the text of the email.

2-9. ORIGINAL DATA

Original observation logs, the exchange file, and other original records generated during a project are legal records that must be retained for data accountability by the Airport Authority. Always submit the original version of the data to the Airport Authority, not a handmade copy, a photocopy, or a digital copy. The contractor will provide NGS a copy of the original data for quality assurance purposes. Original logs and records must be legible, neat, clear, accurate, and fully completed in indelible black ink. All available entries on the recording forms should be

completed or indicated as NA. Original data will be saved, unmodified, whether in handwritten or computer recorded form.

2-9-1. Corrections or Revisions to Data

In the original records (paper or digital), nothing is to be erased or obliterated. If a mistake is made on a form, draw a single line through the mistake (i.e. ~~through the mistake~~) and write the correction above or to the side. If space is too limited to permit a field correction, restart with a new log sheet; however, do not recopy the form in the office in order to make a "clean" copy. An explanatory note should be made for all corrections to the original recorded figures. All editing of computer recorded data will be done on a copy of the original.

CHAPTER 3. NATIONAL SPATIAL REFERENCE SYSTEM (NSRS)

All surveying and positioning must be tied to the NSRS.

3-1. HORIZONTAL CONTROL

Use North American Datum of 1983 and year of the latest observations [abbreviated NAD83 (YYYY)]. Note: The year of observations is on the NGS Data Sheet next to the latitude and longitude.

3-2. VERTICAL REFERENCE

Use North American Vertical Datum of 1988 (NAVD 88). For information on NAVD 88, visit http://www.ngs.noaa.gov/PUBS_LIB/NAVD88/navd88report.htm.

Reference all Ellipsoidal Heights to NAD 83 (GRS 80) realization.

Note: In Alaska and other areas outside the continental United States where NAVD 88 bench marks are not available, the contractor must make the global positioning system (GPS) ties to tidal bench marks within the project area.

3-3. GEOID MODEL

Use the most recent NGS model, which is currently GEOID03. See http://www.ngs.noaa.gov/GEOID/GEOID03/. Note: GEOID heights from the GEOID03 model are only reliable within Continental United States (CONUS) due to the limited extents of the data used to compute it.

Note: Coordinates for North Carolina High Accuracy Reference Network (HARN) stations are not available from NGS. To obtain the HARN coordinates for these stations, contact the State of North Carolina at (919) 733-3836.

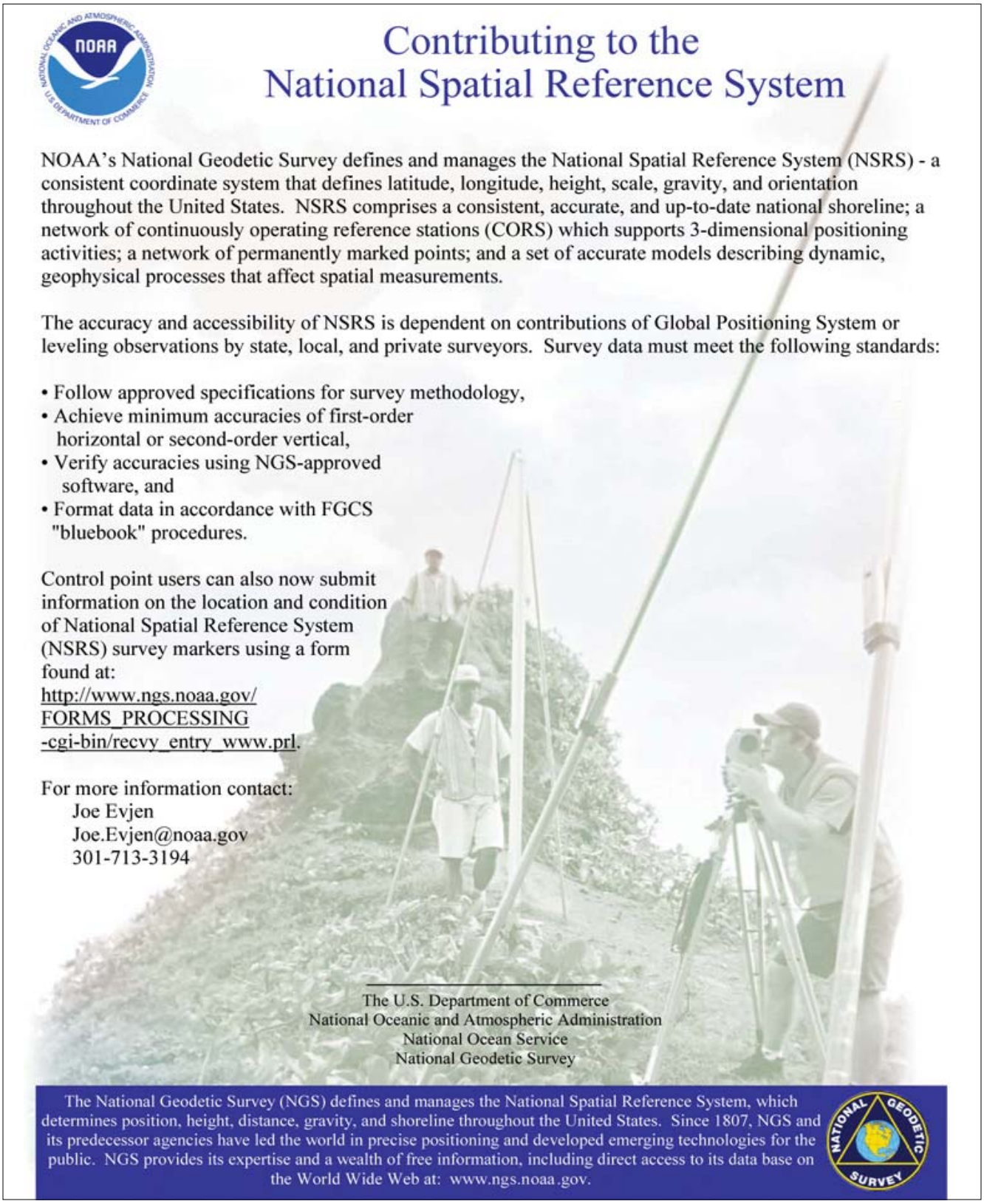

Figure 1.1. The National Spatial Reference System

CHAPTER 4. ACCURACIES

The data collected for the FAA Airport Surveying–GIS Program is critical to the operation and safety of the National Airspace System. Data collected may include any one or a combination of the following:

- Runway end positions
- Runway vertical profiles
- Positions and elevations of navigational aids (NAVAIDs)
- Positions and elevations of obstructions
- Airport features

The geographic coordinate accuracies of this data must meet or exceed the requirements specified in these General Specifications and in the following documents:

- AC 150/53XX-XX, *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey (Volume A)*
- AC 150/53XX-XX, *General Guidance and Specifications for Aeronautical Surveys: Airport Imagery Acquisition and Submission to the National Geodetic Survey (Volume B)*

The aeronautical data may be collected by a combination of remotely sensed and field survey methods. When determining the best method of collection, take into account accuracy and efficiency. Remote sensing techniques do not currently meet the accuracy requirements of some aeronautical features and therefore must be collected by field survey. Most linear features, some obstacles, and visual NAVAIDs are usually more efficiently collected by remote sensing techniques than by using traditional field surveying methods. NGS has found the most accurate product is produced when image control points are established, imagery is geo-referenced, geospatial vector files are compiled, and field verification is performed within 12 months of the imagery acquisition. This timeframe allows the field survey to validate all point features within the data logger (ADCAT) using the OIS model.

4-1. GEODETIC CONTROL

The permanent survey monuments established in the airport vicinity must meet all accuracy requirements and other criteria specified in AC 150/53XX-XX, *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey (Volume A).* These monuments and their accurate connections to the NSRS assure accurate relativity between all surveyed points on an airport and the National Airspace System, including navigation satellites.

4-2. IMAGERY

The georeferenced imagery of the survey area must meet the accuracy requirements specified in AC 150/53XX-XX, *General Guidance and Specifications for Aeronautical Surveys: Airport Imagery Acquisition and Submission to the National Geodetic Survey (Volume B).*

4-3. REMOTELY SENSED SURVEYS

Geospatial vector features extracted from remote sensing technologies must have spatial accuracies reported in ground distances at the 95-percent confidence level. Root-mean-square error (RMSE) should be used to estimate spatial accuracies. Testing is the preferred method of reporting accuracy, where the RMSE is computed by taking the square root of the average of the set of squared differences between twenty or more check point coordinate values and the coordinate values from an independent source of higher accuracy. However, if less than twenty check points are available for testing, then accuracy must be reported as a deductive estimate based on knowledge of errors in each production step. For deductive estimates, Federal Geographic Data Committee (FGDC) compliant metadata and the Survey and Quality Control report should include a reference to complete calibration tests and must describe assumptions about error propagation.

4-3-1. Accuracy Requirements

The accuracy for geospatial vector airport features (taxiway, aprons, ramps, buildings, etc.) must be within 5 feet horizontally and 10 feet vertically. Geospatial features used for geographic orientation (major highways and roads, lakes, rivers, coastline, and other items of landmark value) must be within 20 feet horizontally and 10 feet vertically relative to the NSRS. Derived elevations must be within 10 feet vertically. No point will fall outside the accuracy requirements identified in these General Specifications.

4-3-2. Feature Extraction

Due to the critical nature of aeronautical data, it is important that features are both positioned and attributed accurately. The spatial resolution and vertex spacing must be adequate to guarantee accurate representation of features and not compromise the accuracies stated above. Resolution is defined within this document as the smallest spacing between two display elements, expressed as dots per inch, pixels per line, or lines per millimeter. Also consider the attribute accuracy. Collecting and identifying attributes from imagery requires skill and knowledge of interpreting aeronautical features. The user must be familiar with the feature classes, attributes, and valid record entries used to identify spatial features (refer to Part 2 of this AC).

4-4. FIELD SURVEYS

Each type of field survey has its own unique requirements; although some requirements might be common to two or more of the survey types. For example, Airport Obstruction Chart (AOC), Area Navigation Approach (ANA), and NAVAID surveys all have the same accuracy requirements for positioning navigational aids. Refer to the appropriate section in these General Specifications for the accuracy requirements of a particular survey type.

CHAPTER 5. SURVEY AND QUALITY CONTROL PLAN

5-1. GENERAL REQUIREMENTS

The contractor must check all data to ensure that it is complete, reliable, and accurate. The contractor’s personnel will become thoroughly familiar with these General Specifications, the Appendices, the definitions of aeronautical and surveying terms, and the material covered in other cited references and publications, as required. In addition, before beginning any field work,

the contractor will submit a proposed Survey and Quality Control Plan to the FAA Airport Surveying–GIS Program Manager and NGS POC. NGS highly recommends that the contractor perform the remote sensing survey before the field survey portion of the project.

5-2. REMOTE SENSING AND FIELD SURVEY

The Survey and Quality Control Plan should include the remote sensing, field survey, data collection, and data processing methods and procedures; the survey instrumentation (models and specifications), and the observing plan to be used for the project. NGS recommends that a combination of remote sensing and ground survey techniques be employed to accomplish the survey. The plan must include a report on the combinations of methods to be used and discuss how results will be compared. The plan should indicate how discrepancies between the remote sensing survey and ground survey will be resolved. The contractor must report any deviation from the original plan to the FAA Airport Surveying–GIS Program Manager immediately.

The plan may include, but is not limited to, the following:

- Geo-referencing: Describe in detail the plan for utilizing geo-referenced (aero-triangulated) imagery with acceptable accuracies.
- Feature Extraction: Detail methodologies for collecting airport features, such as airport buildings, the aircraft movement areas, landmark features, and obstructing area limits (3D), with the required horizontal and vertical accuracies.
- Obstruction Analysis: Provide a detailed description of the remote sensing and field survey methods used to identify, locate, and observe the required obstacles relative to the specified Obstruction Identification Surfaces as stated in these General Specifications. The contractor needs to describe the data collection methods with the required horizontal and vertical accuracies.
- Prior Survey Data: Describe the procedure to use previous airport survey data if available and specify the source of the previous data.
- Field Survey Methods: Identify the methods for data collection and processing to be used for observing required features. Include a description of the methods of analysis in the report.
- Geodetic Control: Describe a plan for connecting to and verifying all existing airport control to be used during the survey. The Primary Airport Control Station (PACS) and Secondary Airport Control Stations (SACS) must be used.
- Runway Data: Describe the methods for the ground survey and data collection to be used for identifying, locating, and observing all required runway data.
- NAVAID Data: Describe the survey techniques and procedures used for identifying, locating, and observing the required navigational aids associated with the airport.
- Airport Feature Data: Provide a detailed description of the procedures and methods that will be used for identifying, locating, and observing the required airport feature data associated with the airport.

- Equipment Listing: Provide a complete listing of the equipment to be used in the survey, including model and serial numbers, calibration reports, and equipment maintenance reports. This will include field survey and remote sensing hardware and software.

5-3. QUALITY CONTROL

The Survey and Quality Control Plan must include the quality control (including error analysis) procedures and practices to be followed during data collection and provide traceability and adherence to the requirements of these General Specificationis standard. At a minimum, the plan will include the following:

- Brief summary of methods to be used to help ensure high-quality data.
- Description of the quality control measures in place to ensure that all data will be checked, complete, and reliable and meet the accuracy requirements in these General Specifications.
- Evidence that the methods used to collect the various types of features will meet the desired accuracies.
- Description of data back up and archive procedures and methods to be used to ensure that the original data will not be modified.
- Explanation of the method that will be used to check all file formats and a summary of the file-naming convention for all electronic files.

CHAPTER 6. DATA FORMATS

All data collected must be submitted to the Airport Authority and the FAA Airport Surveying–GIS Program. All geospatial digital data must be inventoried in the Final Project Report and identify the physical file formats. In order to facilitate communication and exchange of information, the following standard formats will be used:

6-1. GROUND CONTROL DATA

Newly established ground control data should be submitted to NGS for inclusion into the National Spatial Reference System (NSRS). This data must be formatted to meet NGS blue book standards as described in AC 150/53XX-XX, *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey (Volume A).*

6-2. DIGITAL IMAGES FROM HAND-HELD CAMERA

Use the JPEG (Joint Photographic Experts Group) format for digital images taken with a hand-held digital camera. This includes the required images of photo points.

6-3. DOCUMENTS OR SKETCHES

Provide reports and diagrams, such as Runway End sketches, in Portable Document Format (PDF).

6-4. GEOSPATIAL VECTOR FILES

The Airport Surveying–GIS Program will initially support the following 3D geospatial vector file formats:

- DWG/DXF (Autodesk AutoCAD)
- SHP (ESRI Shapefile)
- DGN (MicroStation Design File V7/V8)

The contractor must submit requests to use other geospatial vector file formats in writing to the FAA Airport Surveying–GIS Program Manager. All geospatial vector files must conform to the data content specified in Part 2 and Appendix 3, Section 3-1, of this AC.

6-5. EXCHANGE FILE

The output of the data logger (ADCAT) will conform to the Exchange File Format specified in Appendix 2, Section 2-5, Exchange File Format.

CHAPTER 7. SURVEY METHODOLOGY

7-1. REMOTELY SENSED SURVEY METHODOLOGY

Using some method of geo-referencing, either analytical (such as an analytical plotter) or digital (softcopy remote sensing workstation), the user must generate a geo-referenced stereo model[1] of the area encompassed by the Obstruction Identification Surface (OIS) (or as far as is necessary in order to view all required obstructions) in order to perform a remotely sensed obstruction analysis and to extract cartographic features.

7-1-1. Obstruction Analysis

Quite often, features that cannot be detected by a field survey party are detectable through remote sensing. A stereo model referenced to the OIS model is an ideal method to—

- Analyze features relative to the OIS.
- Verify all required obstacles.
- Collect any required obstacles that were not determined by the field survey.
- Delineate entire areas of obstructing ground, trees, or buildings.

7-2-2. Feature Extraction (Vector Collection)

When the type of survey requires cartographic features—such as obstacles, airport movement areas, buildings, roads, and water areas—they are extracted from a stereo model. These features must be collected in three dimensions (x, y, and z). The format must be a 3D ESRI shapefile, MicroStation design file, or AutoCAD drawing file, which can be imported into the Airport Surveying–GIS Program Geographic Information System Database. The attribution must conform to Part 2 and/or Appendix 3, Sections 3-1 or 3-2.

[1] The mental impression of an area or object seen as being in three dimensions when viewed stereoscopically on photographs, also called spatial model, stereoscopic image or stereoscopic model. Department of Defense, Glossary of Mapping, Charting and Geodetic Terms, 4th Edition, 1981.

7-2. FIELD SURVEY METHODOLOGY

The methods of locating and establishing the coordinate values for the required features may consist of various surveying methods. All methods require proper equipment operation as defined by the manufacturer's operating instructions and will adhere to proper and ethical survey techniques and analysis. Field survey methodology may include conventional, GPS, and/or other surveying techniques. New methodologies must be approved and fully explained in the Survey and Quality Control Plan. All methodologies must meet the horizontal and vertical surveying accuracy requirements in these General Specifications, which range from 1.2 inches (3 cm) to 100 feet (30.5 m).

CHAPTER 8. SURVEY WORK

8-1. PURPOSE

The primary objective is to collect field survey data critical to the operation and safety of the NAS. The data collected is used to develop instrument approach and departure procedures, certify airports for certain types of operations, determine maximum takeoff weights, update aeronautical publications, provide geodetic control for engineering projects, assist in airport planning and land use studies, and conduct other miscellaneous activities.

8-2. DATA

The project will include accurate positions and elevations of specific points along runways, runway vertical profiles, positions and elevations of NAVAIDs, positions and elevations of obstructions, and positions and elevations of certain non-obstructing obstacles. For some survey types, data portraying aircraft movement and apron areas, prominent airport buildings, selected roads and other traverse ways, cultural and natural features of landmark value, and miscellaneous and special request items will also be acquired. The accuracy of this data must meet the standards published in this AC.

8-3. PREPARATION

The first step involves evaluating the requirements as stated in the supplemental instructions within the SOW. A careful review of all available data and images will enable the survey team to begin the survey work in an efficient way and to conduct all necessary interviews in a positive and professional manner. The following list will enable the survey team to prepare for the survey. If each item listed below is addressed, the survey team will be ready to begin the survey:

- Ensure a thorough understanding of the OIS to be surveyed, as well as the specifications and requirements outlined in this AC and applicable SOW.
- Note specified and supplemental runway end conditions.
- Note any specific item for this survey (i.e. runway data, new NAVAIDs).
- Check for special requirements for NAVAIDs.
- Review imagery and USGS quadrangles of the airport (a terrain analysis tool).
- Prepare a list of questions for interviews.
- Review Geodetic Control Station descriptions (PACS and SACS) in the NGS Database.

- Review the U.S. Terminal Procedures and airport diagrams at http://avn.faa.gov/index.asp?xml=naco/online/d_tpp or http://avn.faa.gov/index.asp?xml=naco/onlineproducts.
- Review the Airport/Facility Directory.
- Review FAA Form 5010, Airport Master Record, at http://www.gcr1.com/5010web/.
- Coordinate with airport authorities.

Appendix 1 contains additional information and references for review.

8-4. CONTACT WITH AIRPORT AUTHORITIES

Close communication with airport management is critical. Appointments with airport management should be made well in advance to ensure a qualified airport representative is available to discuss the survey. Proper clearances to work in the aircraft operations areas must be obtained prior to performing any work at an airport. A security and safety briefing may be required before field crews are allowed access to the airfield. Follow standard safety procedures and equip all vehicles with flashing yellow lights and radios capable of receiving Air Traffic Control ground and aircraft frequencies. Contact with the airport traffic control tower is mandatory during surveys at controlled airports unless an escort is provided.

8-5. INTERVIEWS

During the interviews, specific questions should be asked (see lists below) and required forms must be signed. In addition, discuss with airport authorities the runway/stopway data published in the latest editions of the Airport/Facility Directory (A/FD), and U.S. Terminal Procedures (TPP), both U.S. Government Flight Information Publications.

During the survey, additional meetings may be required to discuss unusual circumstances, problems, or newly determined runway lengths that differ from those published. Include in the final report a summary of all such meetings.

Upon completion of the survey, the airport authorities may require a final meeting. Turn in any badges, passes, or keys; discuss any significant and/or unusual findings; and notify the airport authorities of your departure. Avoid discussing specific obstruction problems at this time since the data will not been verified. Especially avoid any statements about approaches being “clear,” since the data is unverified and the requirements may vary.

Conduct interviews with the following personnel if possible:

- Airport manager/operations
- Airport engineering
- FAA Air Traffic Control
- FAA Airway Facilities

Note that smaller airports might not have persons in all of these areas.

8-5-1. Airport Manager/Operations

In this interview, obtain permission to enter the airfield for the survey. This interview can also provide valuable information about recent, ongoing, and future construction; obstruction changes; clearing; and operational considerations (scheduled runway closures or special events, high-security areas on the field, etc.). The name of the airport manager/operations person interviewed must be included on the Runway Data Sheet and in the Final Project Report. The Airport Manager/Operations Checklist below is provided as guidance for conducting the interview.

8-5-2. Airport Engineering

This interview will only be necessary or helpful at larger airports. The Engineering Department can provide specific information about runway dimensions, construction projects, and control stations. They can sometimes be helpful in scheduling runway work. It is helpful to include the Engineering Department point of contact in the Final Project Report in case questions arise after the survey.

8-5-3. FAA Air Traffic Control

If an Airport Traffic Control Tower (ATCT) will be in operation during the time of survey, the survey must be discussed with Chief Control Tower Operator or representative. This interview can provide information on operational factors and facilitate the working relationship between the surveying firm and the controllers. The Tower Chief/Watch Supervisor Checklist below is provided as guidance for conducting the interview.

8-5-4. FAA Airway Facilities Personnel

An interview with FAA Airway Facilities personnel is necessary on any airport with FAA navigational facilities. In some cases, the personnel who maintain the facilities for the airport being surveyed might be located at another site and portions of the interview might need to be done by telephone. The first purpose of the interview is to determine all pertinent facilities and changes to navigational aids within 10 nautical miles surrounding the airport. It might be necessary, as well, to schedule a technician to accompany the contractor to certain facilities to let them through a gate or monitor an alarm while survey personnel are within critical areas of the site. The contractor must include on the interview checklist the name of the FAA Airway Facilities point of contact in case questions arise after the survey, including the person’s name, title, address, and telephone number. The FAA Airway Facilities Personnel Checklist below is provided as guidance for conducting the interview.

AIRPORT INTERVIEW CHECKLISTS

Airport Manager/Operations Interview						
Interview Tasks					Date Completed	Initials of Survey Party Chief
1.	Introduce team and explain purpose of the survey.					
2.	Provide a copy of the proposed survey schedule, with work areas identified—preferably on an airport map or diagram. Obtain approval of schedule especially for runway time.					
3.	Request permission to work on the airfield and note each of the following items:	Item	Yes	No		
		Escort required?				
		Radio required?[2]				
		Flashing light required?				
		Other required item(s)[3]				
4.	Runways – discuss any changes in length, width, or repaving since the last survey. Make note of any items identified on the reverse of or as an addendum to the checklist.					
5.	Runways – discuss any planned future changes to the runway(s).					
6.	Obtain and review the current airport obstruction chart or airport layout plan and ask for comments. Make notes directly on the document for field team use.					
7.	Discuss any questions identified in the contract supplementary instructions.					
8.	Discuss changes to planimetry, construction, or facilities. Including planned changes.					

[2] Required Radio Frequency is _____ MHz and preferred call sign is _____ .
[3] List other required items from line 3 above:

Airport Manager/Operations Interview						
Interview Tasks					Date Completed	Initials of Survey Party Chief
9.	Discuss obstructions relating to the airport.	Discussion Item		Yes	No	
		Has any obstruction clearing been conducted?[4]				
		Are there any plans for obstruction clearing?				
		Are there any new obstructions in the airport vicinity?				
10.	Obtain/verify the airport manager's contact information.	First Name				
		Last Name				
		Address Line 1				
		Address Line 2				
		City				
		State				
		Zip Code				
		Office Tel. Number				
		Cell Number				
		Fax Number				
		Email Address				
11.	Discuss field conditions for driving.					
12.	Request keys for gates, as required, or obtain point of contact information for field access.	POC Name				
		POC Telephone				
		POC Cell Number				
		Other Contact Information	Contact Name			
			Contact Number			

[4] Obstruction clearing completed by _____ in (month) _____ (year) _____ .

Obstruction clearing is planned for (month) _____ (year) _____ .

Airport Manager/Operations Interview (cont.)						
Interview Tasks					Date Completed	Initials of Survey Party Chief
13.	Ask about known survey control on the airport.	Discussion Item	Yes	No		
		Installed PACS and SACS in good condition?				
		Is the manager aware of the importance of the PACS and SACS?				
		Are there any other survey control points on the airport?				
14.	Request introduction to Tower Chief or other airport officials.					

Name of Survey Party Chief		Date
Signature of Survey Party Chief		
Name of Airport Manager or Designee		Date
Signature of Airport Manager or Designee		

Tower Chief/Watch Supervisor Interview						
Interview Tasks					Date Completed	Initials of Survey Party Chief
1.	Discuss radio procedures, call sign, radio communications failure procedures					
2.	Provide a copy of the proposed survey schedule, with work areas identified - preferably on an airport map or diagram. Obtain approval of schedule especially for runway time.					
3.	Discuss taxiway designations					
4.	Inquire about restricted areas, radio and visual blind spots					
5.	Obtain/verify the Tower Chief's contact information.	First Name				
		Last Name				
		Address Line 1				
		Address Line 2				
		City				
		State				
		Zip Code				
		Office Tel. Number				
		Cell Number				
		Fax Number				
		Email Address				
6.	Request information regarding FAA Airway Facilities personnel.	POC Name				
		POC Telephone				
		POC Cell Number				
		Other Contact Information	Contact Name			
			Contact Number			
Name of Survey Party Chief						Date
Signature of Survey Party Chief						
Name of Tower Chief or Designee						Date
Signature of Tower Chief or Designee						

FAA Airway Facilities Personnel Interview			
Interview Tasks		Date Completed	Initials of Survey Party Chief
1.	Discuss changes to NAVAID systems.		
2.	Discuss any plans for NAVAID changes in the future.		
3.	Provide a copy of the proposed survey schedule, with work areas identified—preferably on an airport map or diagram. Obtain approval of schedule, especially for NAVAID critical areas.		
4.	Ask about location, accessibility, and associated requirements and obtain directions to any outlying facilities.		

Name of Survey Party Chief		Date
Signature of Survey Party Chief		
Name of FAA Airway Facilities Manager or Designee		Date
Signature of Airway FAA Facilities Manager or Designee		
Additional Remarks:		

8-6. RECONNAISSANCE

The survey reconnaissance should include the following:

- Gathering all available data about the airport.
- Testing and determining that geodetic control monumentation meets requirements.
- Selecting temporary stations sites.
- Collecting terrain information.
- Arranging for access to private or government property.

If the airport authority offers a "familiarization ride" around the airport, it is generally a good idea to accept it both as a gesture of good faith and to learn any shortcuts, trouble areas, or unique characteristics of the airport. The first independent reconnaissance should include recovering control stations (PACS/SACS). and verifying the inventory of navigational facilities. The contractor should use current photographs, the airport diagram, or the Airport Layout Plan (if available) to compare and identify new navigational facilities, new or changed taxiways and aprons, and obvious clearing of obstructions (such as tree cutting). Any differences or changes should be noted for inclusion in the Final Project Report and discussion with airport officials.

8-6-1. Recovery of Existing Survey Marks

The contractor will recover the PACS and two SACS at each airport. Each airport should have these three NGS survey marks in place and may have other, older National Oceanic and Atmospheric Administration (NOAA) marks. A listing of airports with PACS and SACS and the dates they were observed is available at http://www.ngs.noaa.gov/AERO/pacsacstat/pacsacstat.htm. PACS are set to meet high-stability standards and are positioned to meet high-accuracy standards using two, 4+ hour static GPS sessions from the nearest NGS Continuously Operating Reference Station (CORS). SACS have slightly less stringent stability and positioning specifications. For full requirements for PACS and SACS, refer to AC 150/53XX-XX, *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey (Volume A).* The PACS and SACS at each airport will be used as starting control for all surveys at the airports.

Other NGS, National Ocean Service (NOS), and/or U.S. Coast and Geodetic Survey (USC&GS) survey control may also exist on the airport. In addition, control set by other agencies may exist. Any mark selected must meet all site and stability requirements as identified in AC 150/53XX-XX, *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey (Volume A).*and have been tied to the PACS.

If the PACS and/or either of the SACS is not found, is destroyed, is damaged, or is not usable for some other reason, contact the FAA Surveying–GIS Program Manager immediately. The FAA Surveying–GIS Program will review the situation and may reschedule the contract work at this airport.

8-6-2. Verification or Survey Marks

Verification of the PACS and SACS is required. The verification of each control station will include a physical visit to each control station to determine its usability by checking its identity;

ascertaining its unmoved position; determining its condition, stability, visibility; and the submission of recovery information to NGS.

Two independent GPS sessions must be observed, each at least 10 minutes long with a 5-second collection interval, between the PACS and each SACS, or the distance between the PACS and each SACS must be measured using a calibrated EDMI, and an inverse distance computed. Using the NGS program INVERS3D (available on the NGS website at http://www.ngs.noaa.gov/TOOLS/), compute the inverse distance between the published positions of the PACS and each SACS. The newly measured distances or inverse distances (from new observations) must then be compared against the distances determined from the published positions. Elevation checks must be obtained either from GPS observations or from spirit levels. The distances must agree within 3 cm; the difference in ellipsoidal height must agree to +/– 4 cm, and the difference in orthometric height must agree to +/– 5 cm.

A Recovery Form to submit recovery information for the PACS and SACS to the NGS is available at http://www.ngs.noaa.gov/FORMS_PROCESSING-cgi-bin/recvy_entry_www.prl.

Verification is not required if the contractor performing the survey also established the monumentation by satisfying the requirements of AC 150/53XX-XX, *General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey (Volume A)*, for the same airport as part of the same contract.

PART 2. GEOSPATIAL SPECIFICATIONS AND STANDARDS

CHAPTER 9. GEOSPATIAL DETAIL REQUIREMENTS

Geospatial detail collected with remotely sensed or field survey methods consists of airport features such as NAVAIDs, taxiways, and aprons as well as obstacle features and features of landmark value used for general orientation, including shorelines, roads, and railroads. The collection of the linear features must adhere to cartographic rules to ensure topological integrity. These features will be entered into the FAA Airport Surveying–GIS Program Database for GIS analysis and to provide the content with which to create various charts.

9-1. GEOMETRIC REQUIREMENTS

9-1-1. Feature Types

These specifications focus on the definition of 101 geographic features required to depict an airport and its surrounding environment. These include features unique to airports, such as runways and taxiways, as well as more generic features, such as roads and buildings. Each of these 101 types of geographic features is referred to as a Feature Type. A specific instance of a Feature Type is referred to as a Feature Instance. For example, Runways is a Feature Type, but Runway 15R/33L at Boston's Logan International Airport is a Feature Instance. For simplicity in data development and transfer, this standard associates a single geometry with each Feature Type.

9-1-2. Geometry

For the purposes of these specifications, points, lines, and polygons describe geometry. Refer to Part 2, Chapter 10, Collection of Airport Features, and Appendix 3, Section 3-1 (GIS) or 3-3 (CADD) for specific requirements for each feature type.

9-1-2-1. A **point** is the smallest unit of geometry and has no spatial extent. Points are described by two-dimensional (2D) or three-dimensional (3D) coordinates. All feature types except the Airport Reference Point will be collected in 3D coordinates.

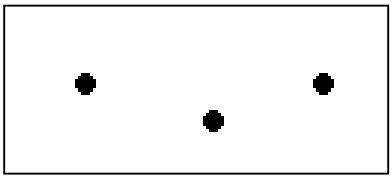

Figure 2-1: Typical depiction of a point

9-1-2-2. A **line** consists of a connected sequence of points. Start- and end-points of a line are referred to as start- and end-nodes. Connecting points that are in between start- and end-nodes are referred to as vertices. Vertices are intermediate points that define the line structure, curvature, or shape. A start-node and an end-node define a line's directionality.

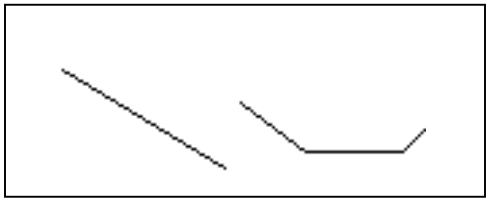

Figure 2-2: Depicts typical examples of a line

9-1-2-3. A **polygon** is a closed figure, or surface, bounded by lines (i.e. a series of lines whose start-node is coincident with another's end-node). These lines form the outer edge of the surface.

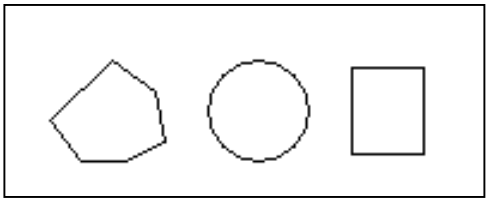

Figure 2-3: Depicts some typical polygon examples

9-1-2-1. Complex Geometry Types, such as arcs, circles, and ellipses, are not included in this standard. This is intended to facilitate data exchange between software handling these complex data types differently. If, in a CADD drawing for example, arcs are used, they must first be broken into a line with vertices placed at intervals sufficient to maintain the accuracy requirements described.

9-1-3. Topological Integrity

The placement of geometric elements (i.e. Feature Instances) in juxtaposition to one another (i.e. next to, connected to, and on top of) is referred to as topology. Topology rules establish requirements for the placement of instances of a Feature Type in relation to one another and in relation to instances of other Feature Types.

To ensure topological integrity, the following guidelines must be followed:

9-1-3-1. Lines

(1). Start-nodes and end-nodes of adjacent line segments belonging to a single feature class must be identical (coincident).

(2). Intersections of lines of the same feature class must be defined by a vertex/node shared by the intersecting lines.

(3). All unintentional dangles (line segments extending beyond the intended end point) and gaps (spaces between line segments that were intended to connect) between lines must be eliminated.

(4). Lines should contain one or more line segments with vertices placed at intervals required so the line feature does not stray from the actual feature by more than the half accuracy limit defined in Appendix A for the Feature Type, as shown below in Figure 2-5.

(5). For lines not naturally joined by physical features (e.g., marking lines), place beginning and ending nodes where an attribute or other property change occurs.

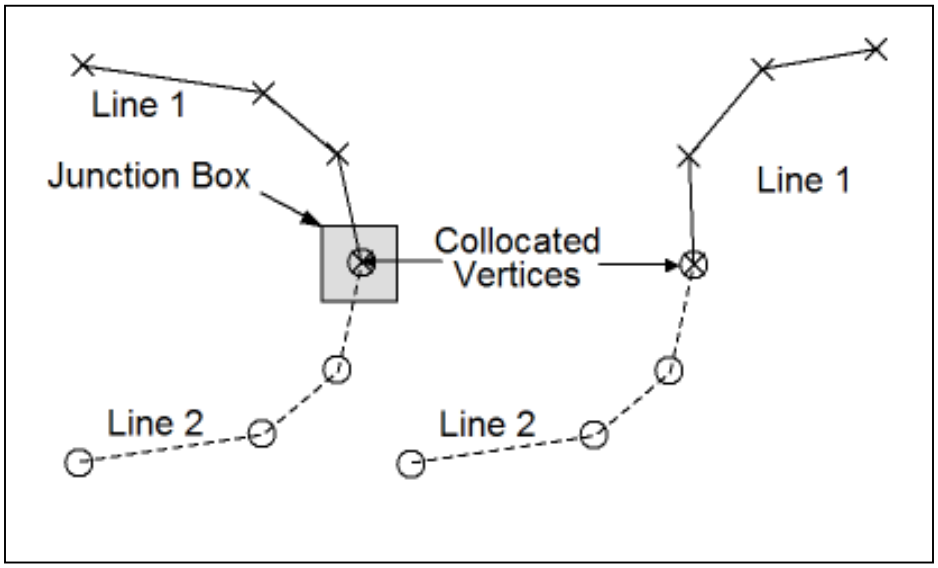

Figure 2-4: Depicts the topology rules for line segments

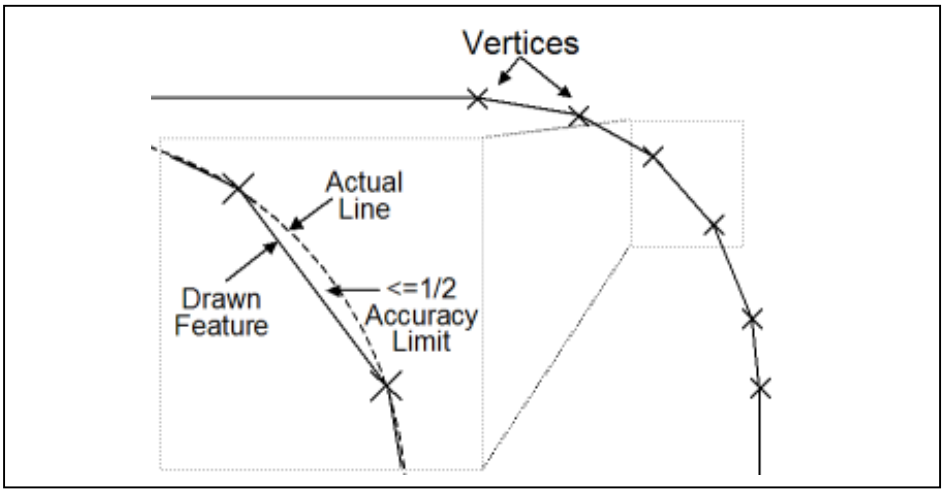

Figure 2-5: Depicting the placement of vertices along a curve

9-1-3-2. Polygons

(1). Geospatial locations of the start-node and end-node of any line forming the edge of a polygon must be identical (coincident) as in Figure 2-6a.

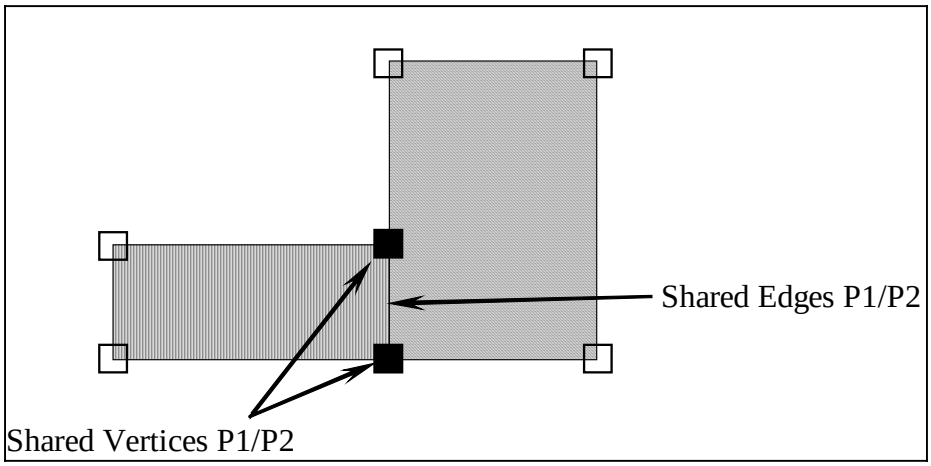

Figure 2-6a: Illustrates the shared edges and shared vertices topological rule

(2). Polygons that share an edge (see Figures 2-6a and 2-6b) will share all vertices along this edge. This must be applied for features of the same feature class and for features of different feature classes.

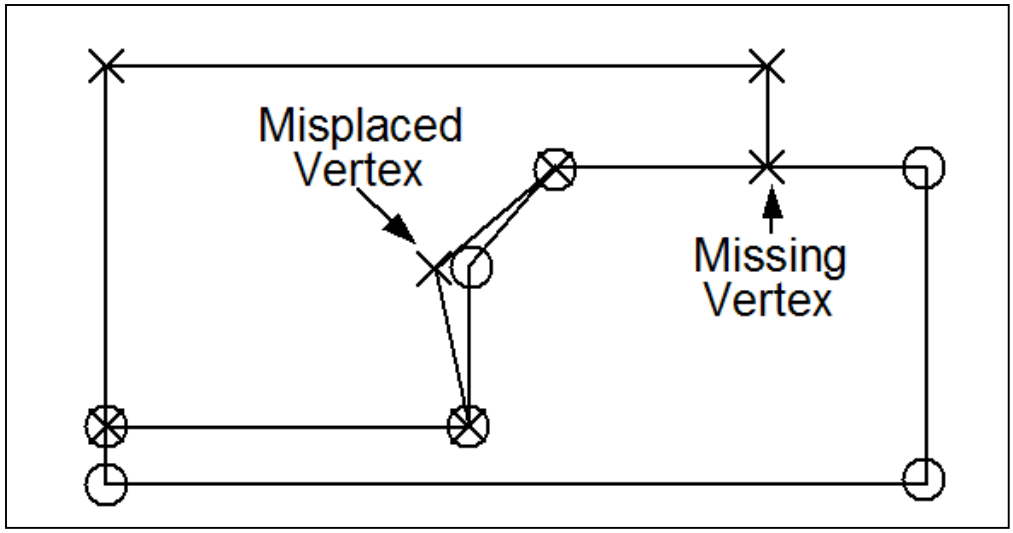

Figure 2-6b: Depicts another example of the placement of vertices of adjacent polygons with misplaced vertices

(3). No polygon will overlap or intersect another polygon of the same class (see Figure 2-7), except for the Runway Class, for which overlapping polygons are allowed.

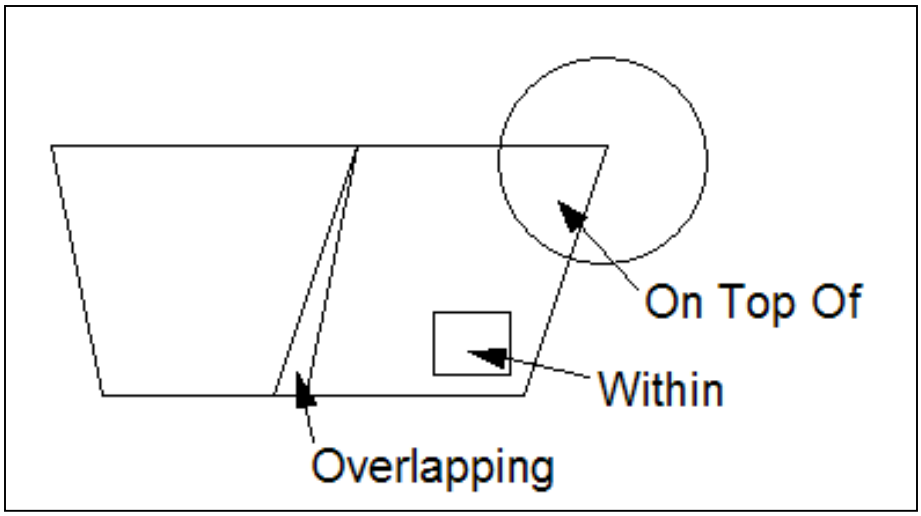

Figure 2-7: Illustrates the topological rule of overlapping polygons of the same feature class

(4). Polygons must always be closed, meaning all vertices must be shared by two adjacent line segments forming the edges of the polygon, as shown in Figure 2-8.

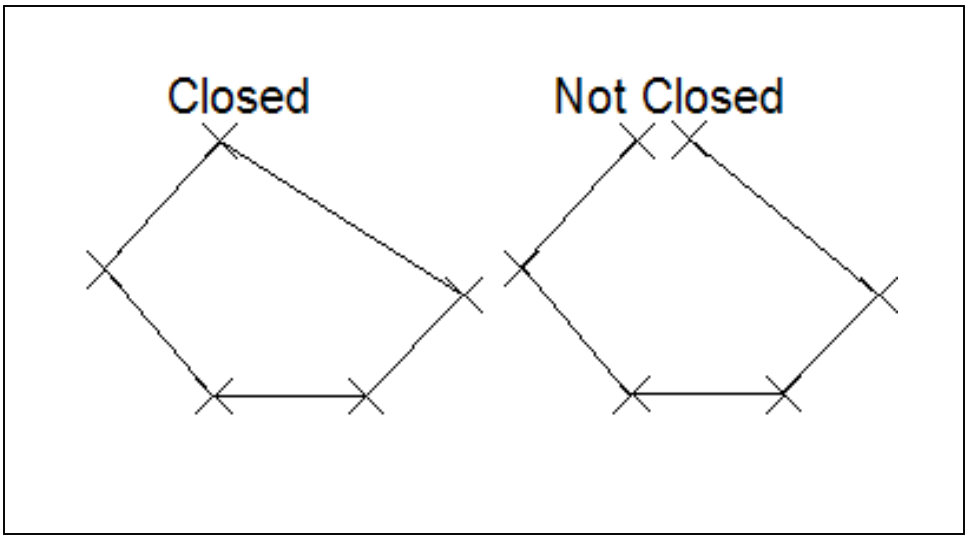

Figure 2-8: Illustrates the difference between closed and unclosed polygons

9-2. LAYERING OF FEATURE TYPES

Each Feature Type corresponds to a single GIS layer and one or more CADD layers in this standard. GIS and CADD software superimpose layers on top of one another to form a map or drawing, as shown in Figure 2-9 below.

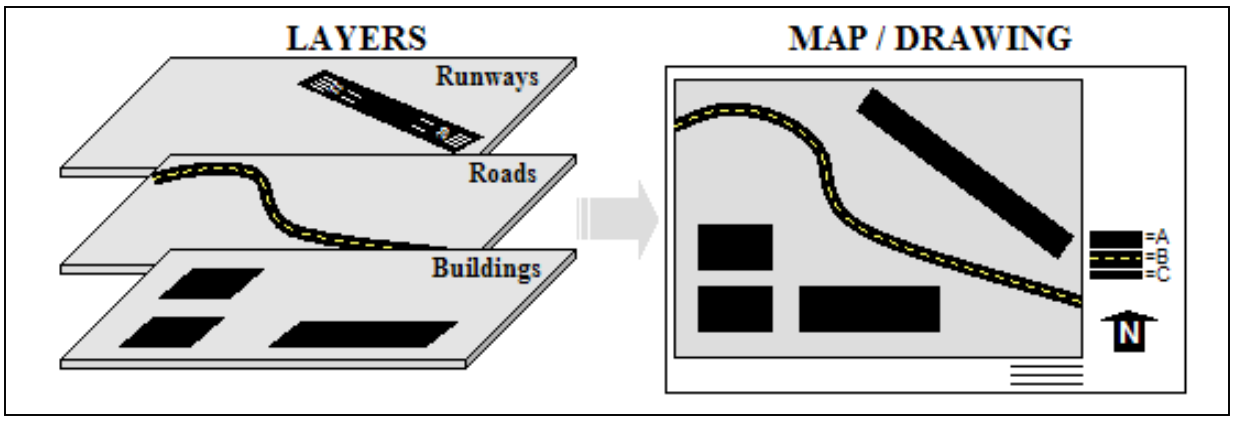

Figure 2-9: Portrays the layering of feature types to form a map or drawing

Because layers are a fundamental element of GIS and CADD software, layers are often associated with tables that contain attributes (e.g., width, material type, condition, etc.), metadata (e.g., accuracy, source, date of relevance, etc.), and properties (i.e. color, line type, etc.). These are covered, respectively, in more detail in the following sections.

9-2-1. Feature Type Layering in GIS Software

GIS software provides a great deal of flexibility when distinguishing, rendering, and annotating different types of features (i.e. Feature Instances) within a single layer (i.e. Feature Type) of a map. Because of this flexibility, features that have the same properties and attributes but have minor differences, such as type and status,- can be grouped onto a single layer but still be displayed differently. The result is that fewer layers can be used to represent more real world situations. Currently in this standard, 37 GIS layers are used to represent all of the features deemed relevant to Airport Obstruction Chart and Airport Layout Plan applications. However, additional features are defined in Appendix 3, Section 3-1, which may also be used in airport GIS applications.

9-2-2. Feature Type Layering in CADD Software

In this standard, 763 CADD layers are used to represent the features deemed relevant to airport GIS applications. These layers can be used as a means to structure the data defined by this standard in CADD software. Each CADD layer is consistent with the layer name format used in the A/E/C CADD Standards and the National CADD Standard, which are based on recommendations made in the American Institute of Architects CAD Layer Guidelines (AIA 2001). Please refer to Appendix 3, Section 3-2, for more information about CADD layers associated with the Feature Types defined in this standard.

9-2-3. Relationship of GIS and CADD Layers

Because many more CADD layers can be used to represent the same features represented on far fewer GIS layers, there is a natural many-to-one matching of CADD to GIS layers. In this standard, the CADD layers associated with each GIS layer are listed in Appendix 3, Section 3-2.

9-3. ATTRIBUTES

Attributes add alphanumeric descriptors to the geometry of a feature. Attributes can contain information such as the name, type, or condition of a feature. For example, the attributes of a

runway include its designator (e.g., 15R/33L), material type (e.g., concrete) and length (e.g., 6,500 feet). Figure 2-10 below shows a typical list of attributes associated with a Feature Type.

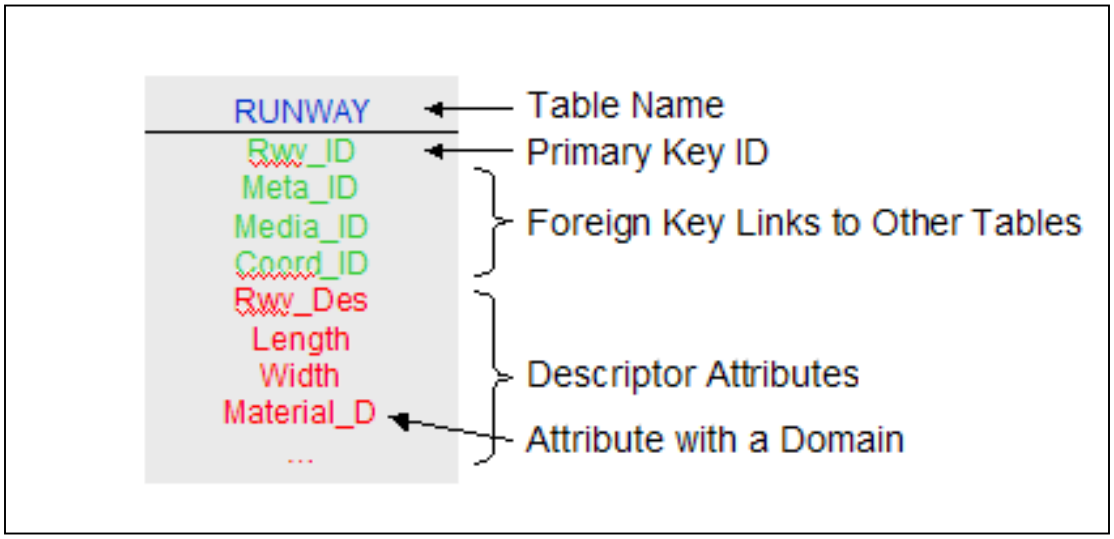

Figure 2-10: Sample Attribute Table for a Feature Type

9-3-1. Domain Values

The values assigned to an attribute are sometimes limited. The range of acceptable values is referred to as the domain for that attribute. Domains limiting attribute values to a range of numeric or date values are referred to as range domains. List domains limit values to a selection of choices. If users can add values to a list of acceptable values and still be compliant with the standard, the list is referred to as a code list. If users cannot add to the list, it is referred to as an enumeration. In this standard, most of the list domains are enumerations, and the name of each attribute with a domain ends with "_D". For each such attribute, there is an associated table in Appendix 3, Section 3-2, listing the acceptable values and their definitions.

9-3-2. Primary Key Identifiers

Primary Keys are attributes used by the system to uniquely identify each record (i.e. feature instances). Primary key values must be globally unique, meaning that there is no other record in the FAA Airports GIS system or any other systems that will exchange data with the FAA Airports GIS system that have the same identifier. Maintaining this uniqueness is critical to ensuring long-term data integrity of the system. To help establish uniqueness, a numeric ID that contains the FAA region, airport location ID, feature type, date, and a timestamp is used. Since FAA region, airport location, and feature type are text values, corresponding numeric values have been assigned in the domain tables found in Appendix 3, Section 3-2.

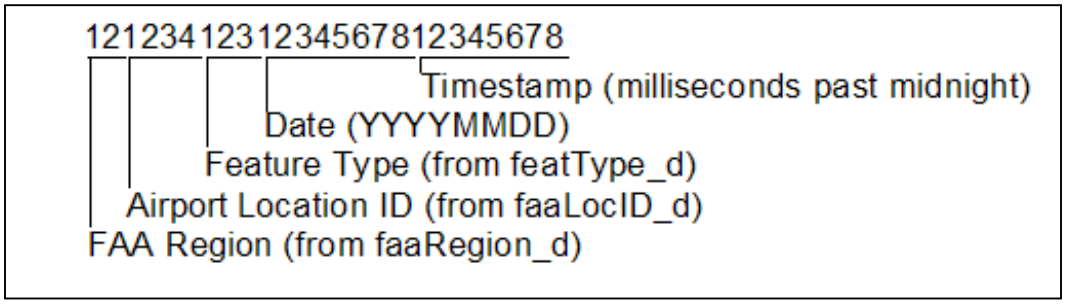

Figure 2-11: Format for globally unique primary keys

9-3-3. Foreign Key Identifiers

Attributes containing primary key values of related records in other Feature Type tables are called foreign key identifiers. Foreign key identifiers provide a link between different types of features with logical relations. For example, a taxiway leading to a runway might carry a foreign key to the runway table populated with the primary key value for that runway.

9-4. METADATA

Metadata is information about the data itself, such as its source, accuracy, and the dates during which it is valid. Metadata values take the form of alphanumeric descriptors of the data and, in this way, are very similar to attributes. For clarity and because they are stored separately, metadata descriptors are referred to in this standard as metadata elements and not as attributes.

Metadata elements can be applied at various levels of data aggregation. They can describe a collection of data submitted at one time. A collection may comprise one or more drawings that contain several layers, such as those that make up an Airport Layout Plan; several individual shape files each representing a layer; a single layer stored in a drawing or shape file; or any other combination of allowable data sets. Metadata elements can also describe all geometry and attributes on a given layer or Feature Type, as is the case with traditional FGDC-compliant metadata. This level of metadata applies if different layers within a collection have different metadata. Next, metadata elements can describe a given feature instance. This level applies when individual features or groups of features within a layer have different metadata. Finally, they can describe the geometry and each attribute of a given feature instance separately.

For this standard, metadata is required at the collection level when data is submitted. The standard also accommodates metadata elements at the feature type, feature instance, and attribute levels. More detailed metadata increases the usefulness of the data provided. Accordingly, data providers are encouraged to submit metadata at the most detailed level possible. This standard uses metadata elements defined by International standards Organization's (ISO) Geographic Information–Metadata Standard (ISO 19115). Of the 409 elements defined in ISO 19115, only 25 are used by this standard because many of the elements defined in ISO are classified as optional or conditional and do not apply to this standard. Furthermore, some of the mandatory elements in the ISO standard are redundant with the specifications of this standard and are therefore not necessary for data exchange. For example, the security classification code is a mandatory ISO element, but since this standard sets the classification code based on the Feature Type, it is not necessary to convey the security classification code in metadata. Figure 2-13 lists

each metadata element used in this standard along with the level of applicability. Further details about these metadata elements are provided in Appendix 3, Section 3-4.

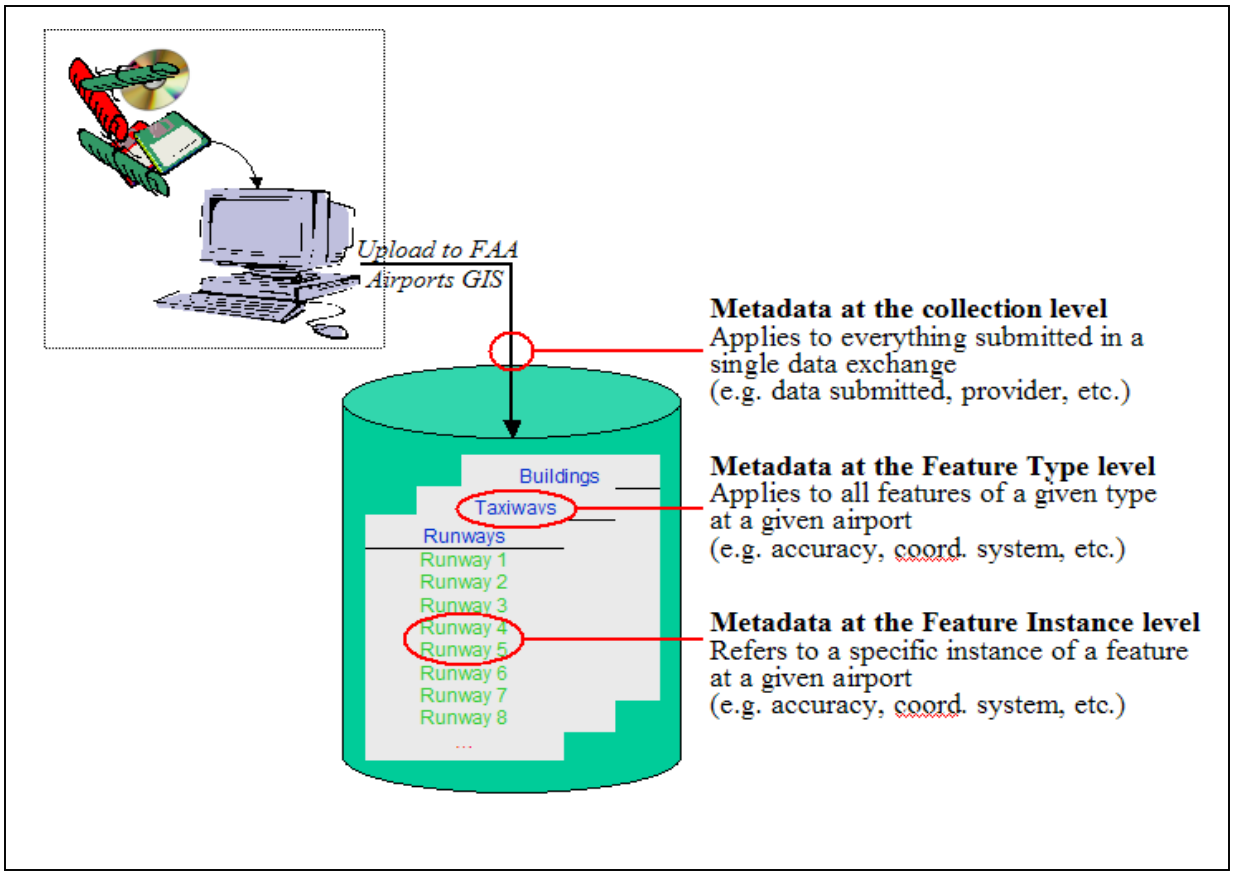

Figure 2-12: MetaData elements have different levels of aggregation

	Collection	Set	Feature
Overview			
Abstract	X	X	X
Status	X	X	X
GeometricObjectCount	X	X	
Scope			
Dataset	X		
Features	X	X	
Attributes			X
Usage			
SpecificUsage	X	X	X
BegusageDateTime	X	X	X
EndUsageDateTime	X	X	X
Source			
Statement	X		
IndividualName	X		
OrganizationNae	X		
PositionName	X		
DeliveryPoint	X		
City	X		
AdministrativeArea	X		
PostalCode	X		
ElectronicMailAddress	X		
VoicePhoneLine	X		
Coordinate System			
Projection	X	X	
HorizontalDatum	X	X	
VerticalDatum	X	X	
Code	X	X	
Data Quality			
HorizontalAccuracy	X	X	X

	Collection	Set	Feature
VerticalAccuracy	X	X	X
EvaluationMethodName	X	X	X
EvaluationMethodDescription	X	X	X
Pass	X	X	X
GroundSampleDistance	X	X	X

Table 2-13: List of MetaData elements

9-4-1. Temporal Relevance

One of the most critical metadata elements to the aviation industry is time. The speed at which aircraft travel and the frequency of airport infrastructure changes require spatial data to carry an indication of the time period for which it is valid. An aircraft's location along a flight path might only be valid for a moment, whereas the existence of a runway might be valid from when it was authorized for use until further notice. This standard defines the beginning and ending date and the time for which each feature instance is valid. All features must carry a beginning date (i.e. data is valid until further notice), an ending date (i.e. the data expires at a specified time) or both (i.e. the data is valid only during the period specified). These values are held in the begUsageDateTime and endUsageDateTime defined in Appendix 3, Section 3-4. Dates and times should be recorded based on Aeronautical Information Regulation and Control (AIRAC) requirements defined in ICAO Annex 15–Aeronautical Information Services (AIS).

9-4-2. Accuracy

One metadata element particularly important to airport GIS applications is accuracy. Accuracy is broadly defined as the quality of nearness to the true value. For the exchange of data as specified in this standard, it is important to be more specific. This standard, therefore, provides limits for the absolute horizontal positional accuracy of each Feature Type. These limits are described as a maximum number of feet between a feature's actual position and the position indicated in the data provided. The actual position is defined as the feature's true location on the specified GEOID. Since the earth's surface has many variations, it is approximated by what is referred to as a GEOID. Furthermore, the difference between a feature's true and recorded positions is required at a 95 percent confidence level. This means that statistically, 95 percent or more of the features provided fall within the required accuracy limit. For some features classes, vertical accuracy limits are also provided. These accuracies are expressed as the maximum number of feet a feature's recorded elevation can differ from its actual elevation. Again, the actual elevation is measured from the GEOID elevation at that location. Elevations are also to be provided at a 95 percent confidence level. Accuracy requirements are driven by how the data is to be used. The location of an airport on a map used for aircraft navigation must be much more accurate than its location on a national map of airports intended for informational purposes. This standard provides accuracy guidelines for maps used for Airport Layout Plans. The accuracy guidelines provided in this standard have been derived from several sources, including FAA's Specification 405, RTCA's User Requirements for Aerodrome Mapping Information, and FGDC's Geospatial Positioning Accuracy Standards Part 4, (indicated in order of precedence). Further information on accuracy definitions and methods to assess the accuracy of existing data

can be found in FGDC's Geospatial Positioning Accuracy Standards, Part 3: National Standard for Spatial Data Accuracy (FGDC-STD-007.3-1998).

9-4-3. Security Sensitivity Levels

Another important metadata element is sensitivity level. Because spatial data can be used for nefarious purposes, it is important to protect it from unauthorized users. The Title 49, Code of Federal Regulations, Part 1520, defines Sensitive Security Information (SSI) and how it should be protected. Based on this definition, many forms of spatial data can be considered SSI. Protecting sensitive spatial data is therefore not just good practice, it is the law. Being too protective of data, however, can unnecessarily limit its usefulness. The challenge is to restrict data to users having an operational need to know and whose credentials the data provider has qualified. With spatial data this challenge is particularly complex because there is such a wide variety of data users and ways in which they need to use the data. One of the more efficient ways of restricting access to spatial data is to apply specific restrictions at the Feature Type level. This standard applies one of the following sensitivity levels to each Feature Type. These are based on classifications listed in the MD_ClassificationCode list in ISO 19115.

- Unclassified data is available for general disclosure.
- Restricted data is not available for general disclosure.
- Confidential data is available to persons who can be entrusted with the information.
- Secret data is to be kept private, unknown, or hidden from all but a select group of people.
- Top Secret data is of the highest secrecy restricting access to only those requiring access to perform their jobs.

Since sensitivity levels are established for each Feature Type by this standard (see Part 2, Chapter 10, Collection of Airport Features, and Appendix 3, Sections 3-1 (GIS) and 3-3 (CADD)), it is not necessary to carry this information (i.e. a classification code in ISO terminology) in the metadata itself.

9-5. COORDINATE SYSTEMS

Spatial data can be provided in a variety of coordinate systems using a variety of datum and units of measure. For the purposes of data exchange, any combination of the following alternatives is acceptable.

9-5-1. Acceptable Coordinate Systems

To be compliant with this standard, spatial data must be submitted in either a latitude/longitude (i.e. projected) or a standard state plane (i.e. grid based) coordinates system.

9-5-1-1. Latitude/longitude data must provide data in decimal degrees with negative value longitudes for data in the Western hemisphere.

9-5-1-2. State plane data must provide data in U.S. survey feet as defined by any of the accepted U.S. State Plane Coordinate System definitions.

9-5-2. Acceptable Datum

With regard to spatial data, a datum is a reference to an approximation of the earth's surface or a GEOID. The following datum should be used for spatial data that is submitted in compliance with this standard.

9-5-2-1. All horizontal data should be submitted in relation to the North American Datum of 1983 (NAD83).

9-5-2-2. All vertical data should be submitted in relation to the North American Geodetic Vertical Datum of 1988 (NGVD88).

9-6. ACCEPTABLE DATA FORMATS

Submit Airport spatial data defined in this standard to FAA by uploading one or more of the following file types at the FAA Airport Surveying–GIS Program website (http://airports-gis.faa.gov/).

9-6-1. Airport Survey Data

This data must be submitted using the FAA/NGS-developed Aeronautical Data Collection and Analysis Tool (ADCAT). This software program is available from the FAA Airport Surveying–GIS Program website (http://airports-gis.faa.gov/).

9-6-2. Airport Layout Plan Data

Digital versions of Airport Layout Plans and other vector data defined in this standard should be submitted in one of the following formats.

- Autodesk DWG format (version 2002 or later) with attributes defined as object data.
- Microstation DGN format (version X or later).
- ESRI Shape File format with attributes and metadata elements provided as attributes within each shape file.
- Level 0 Profile of Geographic Markup Language (GML) (version 3) and in compliance with the Air Model of the FGDC Framework Data Standards.

9-6-3. Raster Imagery

Raster data is a form of spatial data where rectangular cells each carrying a value are organized into rows and columns. One of the most common forms of raster data is digital imagery in which each cell or pixel of the image carries a grayscale value in the case of black-and-white photographs or red/green/blue values in the case of color photographs. Images taken from aerial or satellite platforms can be orthorectified, meaning that the cells or pixels of the image are positioned to represent their true position on the face of the earth (i.e. removing distortions caused by camera angle, terrain, etc.). Figure 2-14 provides an example of an orthorectified raster image of an airport. Orthorectified raster imagery can be uploaded to the FAA Airport Surveying–GIS Program website (http://airports-gis.faa.gov/). Imagery specifications can be found in AC 150/53XX/XX (Volume B).

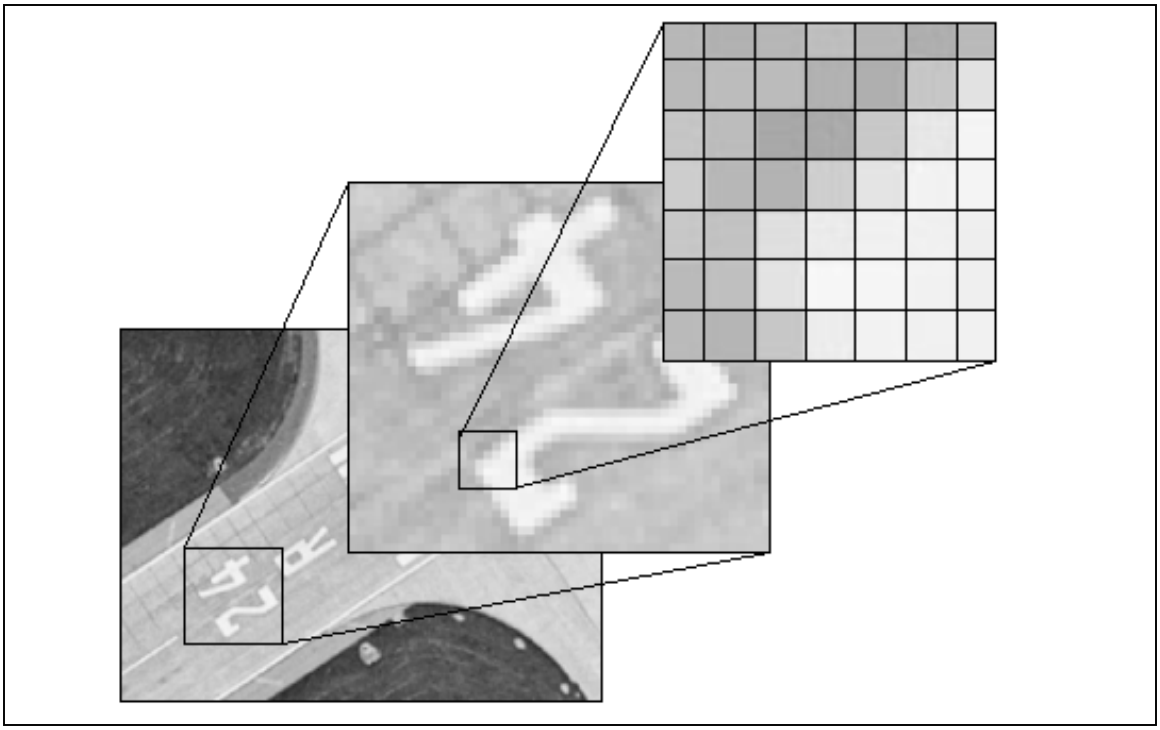

Figure 2-14: Example of Raster Imagery

CHAPTER 10. COLLECTION OF AIRPORT FEATURES

The following is a list of airport features that may be collected either through remote sensing and/or field survey methods. There is an additional category of required features where the collection methodology is not specified. Each feature is described by geometry type, feature group, sensitivity, requirements, positional accuracy, data capture rule, and the attributes required to provide the content for either an Airport Obstruction Chart or an Airport Layout Plan. The features are subdivided into three categories of collection methodology—*remotely sensed*, *field survey*, or *combination of remotely sensed and field survey*—depending on accuracy requirements and efficiency. Additional features defined and contained within the Airport Surveying–GIS Program database are defined in Appendix 3, Section 3-1 (GIS) and associated CADD Layers in Section 3-3 for other airport GIS applications.

10-1. REMOTELY SENSED FEATURES

The first category of airport features comprises those features most efficiently collected by remote sensing methods. These features include all landmark segment (refer to feature class landmark segment below) features collected as vector data and obstacles. Verify all obstacles collected by remote sensing methods by field survey methods.

10-1-1. Apron

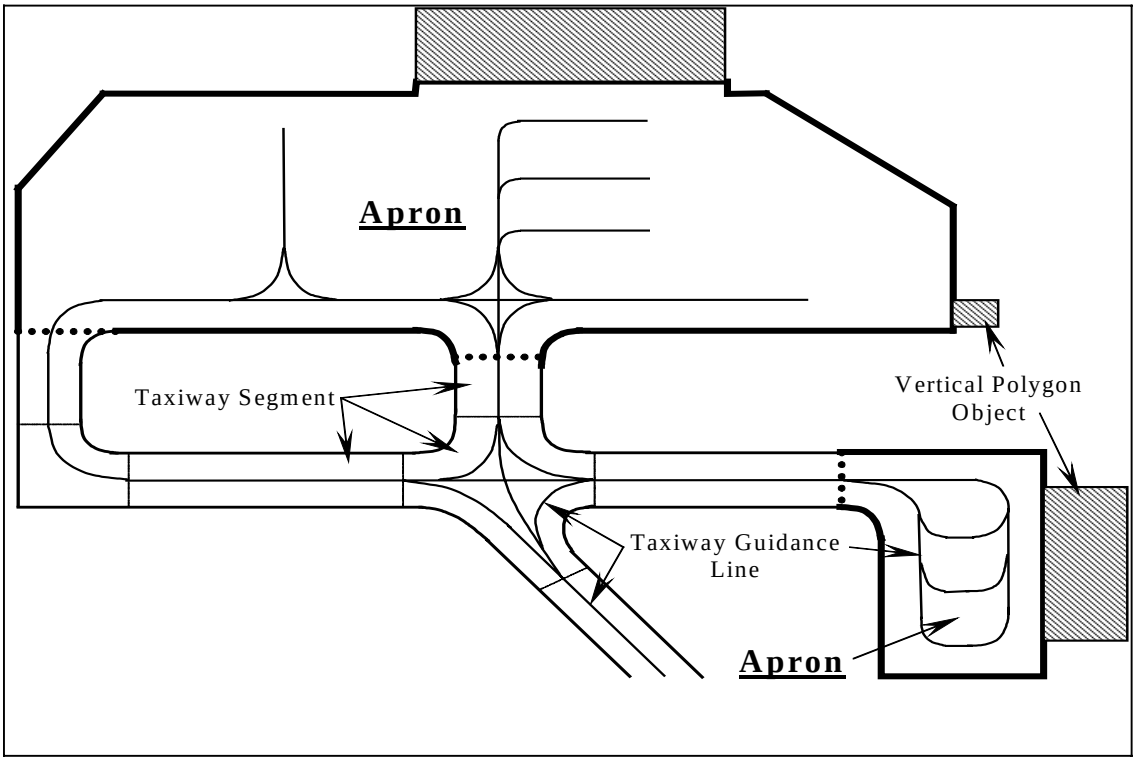

Figure 2-15: Illustrates the collection of the airport apron

10-1-1-1. Definition: A defined area on an airport or heliport, paved or unpaved, intended to accommodate aircraft for purposes of loading or unloading passengers or cargo, refueling, parking, or maintenance.

10-1-1-2. Geometry Type: 3D Polygon

10-1-1-3. Feature Group: Airfield

10-1-1-4. Sensitivity: Restricted

10-1-1-5. Requirements: Aircraft accessible apron areas—including helipads, parking stand areas, parking stand taxiways, deicing areas, and apron taxiways—must be collected as individual polygon objects. Unpaved tiedown areas must also be collected as individual polygon objects if permanent tiedown fixtures are present and any portion of the area is located within 200 feet of a primary or approach obstruction identification surface. If any portion of the area meets these criteria, the entire tiedown area will be collected.

10-1-1-6. Positional Accuracy:
(1). Horizontal: maximum 5 feet
(2). Vertical: maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation

10-1-1-7. Data Capture Rule: An apron may consist of multiple polygons. The apron boundaries must be located in the center of the painted ground marking. When there are no painted ground markings, the outer edges of the apron pavement must be collected. For unpaved tiedown areas, the outer edges of the approximate limits must be collected. These areas must be attributed as unpaved in the "surfaceType_d" attribute and labeled "UNPAVED TIEDOWN AREA" in the "feat_desc" attribute. It is recommended that the surveyor verify and/or sketch the unpaved tiedown areas to ensure the correct limits are determined during compilation.

10-1-1-8. Required Element For: ALP/AOC

10-1-1-9. SDSFIE Equivalent Type: airfield_surface_type

10-1-1-10. Attributes:

Attribute	**Description**
air_sur_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
apronType_d (Enumeration)	A classification of the typical use for the apron
feat_name (String30)	The name of the feature [Source: SDSFIE Feature Table]
feat_desc (String255)	Description of the feature
tiedowns (Integer)	The approximate number of tiedowns in the surface [Source: SDSFIE Feature Table]

status_d (Enumeration)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
surfaceType_d (Enumeration)	A classification of airfield pavement surfaces for Airport Obstruction Charts [Source: NGS]
surfaceMaterial_d (Enumeration)	A code indicating the composition of the related surface [Source: NFDC]
pavementClassificationNumber	A number that expresses the relative load-carrying capacity of a pavement in terms of a standard single wheel load [Source: AC 150/5335-5]
surfaceCondition_d (Enumeration)	A description of the serviceability of the pavement [Source: NFDC]
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-1-2. Building

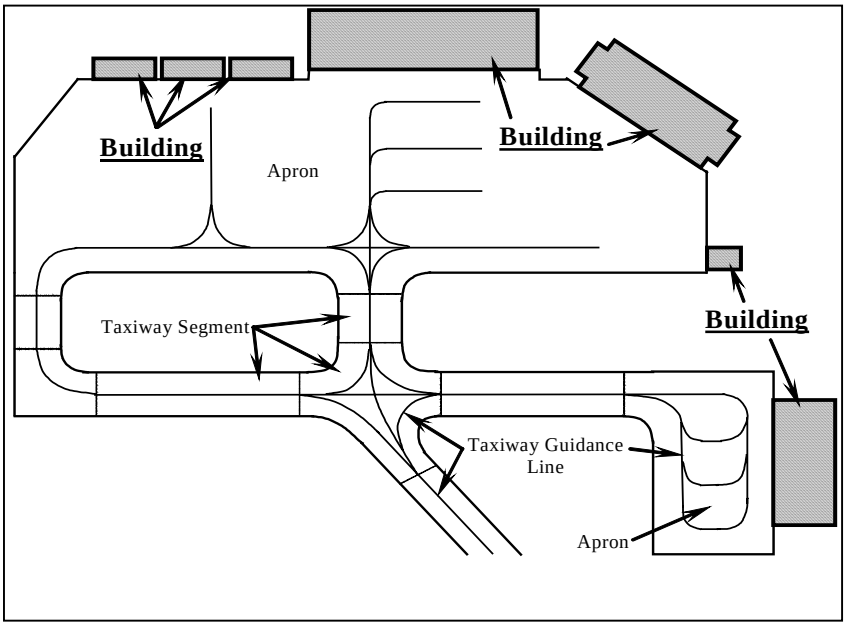

Figure 2-16: Illustrates the collection of an airport building

10-1-2-1. Definition: A three-dimensional structure (i.e. hangars, terminals, etc.) modeled with a bounding polygon.

10-1-2-2. Geometry Type: 3D Polygon

10-1-2-3. Feature Group: Manmade Structures

10-1-2-4. Sensitivity: Restricted

10-1-2-5. Requirements: The terminal building complex, plus hangars, maintenance facilities, and other prominent buildings directly associated with aircraft operations and directly connected to the apron, must be determined as individual polygon objects. Only recently constructed and/or completed buildings that are not visible on imagery and meet the above requirements criteria must be collected by field survey methods.

10-1-2-6. Positional Accuracy:
(1). Horizontal: maximum 5 feet
(2). Vertical: Maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation.

10-1-2-7. Data Capture Rule: The building footprints must be collected when possible. All top elevations must be determined at the highest point of the corresponding building. The height of the polygon is determined as the difference between the base elevation and top elevation.

10-1-2-8. SDSFIE Equivalent Type: structure_existing_site

10-1-2-9. Required Element For: ALP/AOC

10-1-2-10. Attributes:

Attribute	**Description**
buildng_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
buildng_no (String16)	The code indicating the number of the building [Source: SDSFIE Feature Table]
name (String40)	Name of the feature.
narrative (String240)	A description or other unique information concerning the subject item, limited to 240 characters [Source: SDSFIE Feature Table]
str_type_d (String16)	The type of structure [Source: SDSFIE Feature Table]
str_stat_d (String16)	Discriminator. This value differentiates structure entities by operational status [Source: SDSFIE Feature Table]
no_occup (Real)	Number of persons currently occupying the structure [Source: SDSFIE Feature Table]
areaInside (Real)	Total inside area of structure [Source: SDSFIE Feature Table]
structHght (Real)	Maximum height of structure [Source: SDSFIE Feature Table]
areaFloor (Real)	Total inside floor area [Source: SDSFIE Feature Table]
lightingType_d (Enumeration)	A description of the lighting system. Lighting system classifications are Approach Airport Runway

	classifications are Approach, Airport, Runway, Taxiway, and Obstruction.
markingFeatureType_d	The type of the marking
color_d (Enumeration)	The color of the marking
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-1-3. Construction Area

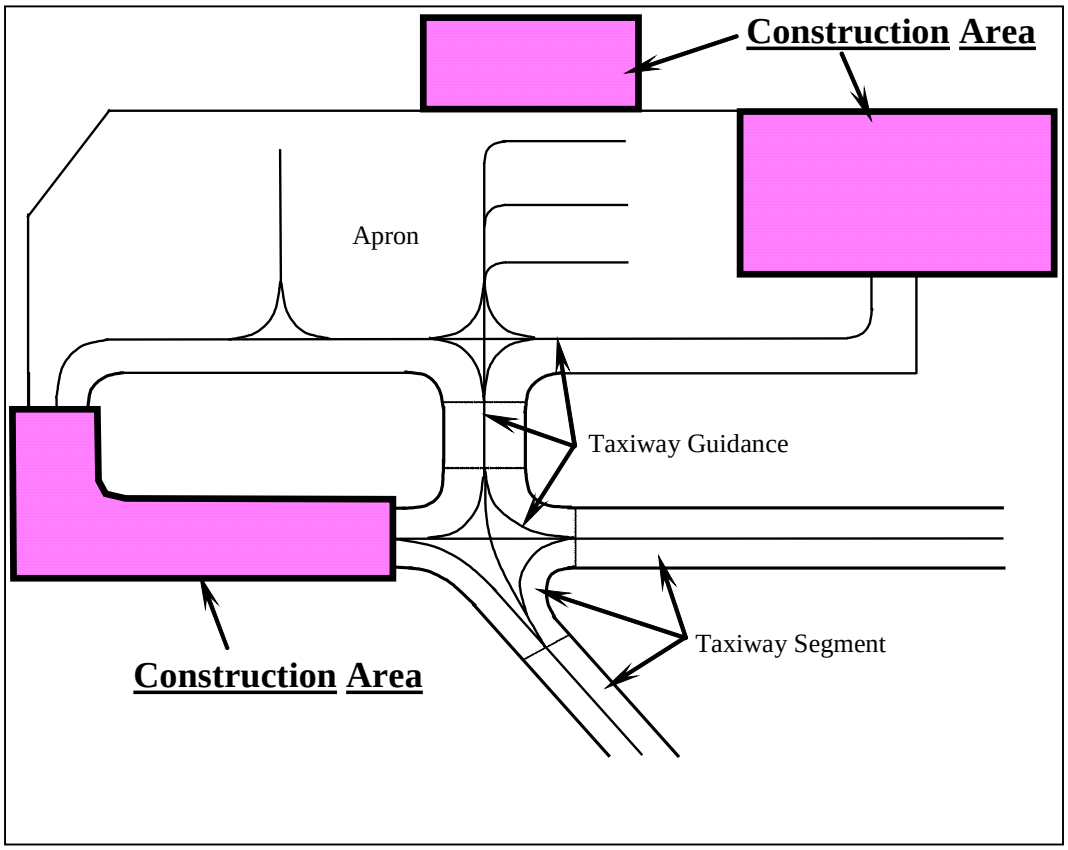

Figure 2-17: Illustrates the collection of an airport construction area

10-1-3-1. Definition: A defined area that is under construction, not intended for active use until authorized by the concerned authority. The area defines a boundary for personnel, material, and equipment engaged in the construction activity.

10-1-3-2. Geometry Type: 3D Polygon

10-1-3-3. Feature Group: Manmade Structures

10-1-3-4. Sensitivity: Restricted

10-1-3-5. Requirements: All airport-related buildings and aircraft movement areas under construction at the time of survey must be determined as individual polygon objects. Areas under construction that are not visible on imagery must be indicated on a sketch and/or photograph by the field surveyor with dimensions that are referenced to existing points on the imagery.

10-1-3-6. Positional Accuracy:
(1). Horizontal: maximum 50 feet
(2). Vertical: maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation

10-1-3-7. Data Capture Rule: The outer edges of an area under construction must be captured.

10-1-3-8. SDSFIE Equivalent Type: construction_site

10-1-3-9. Required Element For: ALP/AOC

10-1-3-10. Attributes:

Attribute	**Description**
conproj_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
const_name (String30)	Name of the construction area [Source: SDSFIE Feature Table]
const_desc (String60)	Description of the construction area [Source: SDSFIE Feature Table]
projectName (String60)	The name of the construction project
projectStatus_d (Enumeration)	The status of the construction project
CoordinationContact (String75)	Airport, emergency, airline, tenant, and contractor personnel who are responsible for coordinating on-airport construction work
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-1-4. Deicing Area

10-1-4-1. Definition: An aircraft deicing facility is a facility where: (1) frost, ice, or snow is removed (deicing) from the aircraft in order to provide clean surfaces and/or (2) clean surfaces of the aircraft receive protection (anti-icing) against the formation of frost or ice and accumulation of snow or slush for a limited period of time [Source: AC 150/5300-13].

10-1-4-2. Geometry Type: 3D Polygon

10-1-4-3. Feature Group: Airfield

10-1-4-4. Sensitivity: Unclassified

10-1-4-5. Requirements: Capture each designated deicing area as a separate polygon if the areas are not collocated.

10-1-4-6. Positional Accuracy:
(1). Horizontal: maximum 50 feet
(2). Vertical: maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation

10-1-4-7. SDSFIE Equivalent: None

10-1-4-8. Data Capture Rule: Deicing areas may consist of a single or multiple polygons, capturing the outer edges of area(s).

10-1-4-9. Required Element For: ALP

10-1-4-10. Attributes:

Attribute	**Description**
aircraftdeicingarea_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
name (String40)	Name of the feature.
area_desc (String254)	A brief description of the area and any special characteristics [Source: SDSFIE Attribute Table]
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-1-5. Helipad TLOF

10-1-5-1. Definition: A load-bearing, generally paved area, normally centered in the Final Approach and Takeoff Area FATO, on which a helicopter lands or takes off. The Touchdown and Lift-off Area TLOF is frequently called a helipad or helideck.

10-1-5-1. Geometry Type: 3D Polygon

10-1-5-1. Feature Group: Airfield

10-1-5-1. Sensitivity: Unclassified

10-1-5-1. Requirements: All paved helipads (TLOF) that are isolated from other apron areas must be collected as individual polygon objects. For purposes of the AOC, helipads on other aircraft movement areas (i.e. from taxiways, aprons, etc.) do not need to be identified.

10-1-5-1. Positional Accuracy:
(1). Horizontal: maximum 5 feet
(2). Vertical: maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation

10-1-5-1. Data Capture Rule: The center of the white paint stripes along the outer edges of the TLOF must be captured as a solid line and labeled "HELIPAD." When there are no outer paint stripes, the outer edges of the TLOF pavement must be collected. All TLOFs located on the aircraft movement areas may be collected at compiler's discretion.

10-1-5-1. SDSFIE Equivalent: None

10-1-5-1. Required Element For: ALP/AOC

10-1-5-1. Attributes:

Attribute	**Description**
helipad_design (String30)	The name of the feature [Source: SDSFIE Feature Table]
elevation (Real0)	The elevation of helipad measured from mean sea level (MSL) [Source: SDSFIE Attribute Table]
status_d (Enumeration)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
feat_len (Real)	The overall length of the airfield surface [Source: SDSFIE Feature Table]
feat_width (Real)	The overall width of the airfield surface [Source: SDSFIE Feature Table]
surfaceType_d (Enumeration)	A classification of airfield pavement surfaces for Airport Obstruction Charts [Source: NGS]
surfaceCondition_d (Enumeration)	A description of the serviceability of the pavement [Source: NFDC]
surfaceMaterial_d (Enumeration)	A code indicating the composition of the related surface [Source: NFDC]
pavementClassificationNumber	A number that expresses the relative load carrying capacity of a pavement in terms of a standard h l l d [S AC

	single wheel load [Source: AC 150/5335-5]
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-1-6. Landmark Segment

10-1-6-1. Definition: Geographic features that provide geographic orientation near the airport vicinity. The features may or may not have obstruction value. These may include objects such as roads, railroads, fences, utility lines, shoreline, levees, quarries, etc.

10-1-6-2. Geometry Type: 3D Line

10-1-6-3. Feature Group: None

10-1-6-4. Sensitivity: Unclassified

10-1-6-5. Requirements: All geographic features of landmark value aiding in geographic orientation must be collected as individual polyline objects. These features include, but are not limited to, the following:

(1). A selection of roads (i.e. major highways, primary roads, etc.) and railroads, especially in the airport vicinity, to assist the user in geographic orientation.
(2). Shoreline (i.e. coastlines, lakes, rivers, etc.) of landmark value that aid in geographic orientation.
(3). Utility lines (i.e. transmission lines), levees, fence lines, or other linear features having obstruction or landmark value.
(4). Buildings or other features of landmark value that aid in geographic orientation.
(5). Runways with specially prepared hard surfaces that are not located on the airport being surveyed, but fall within the survey limits.
(6). Closed runways if they are sufficiently prominent to be of value to a pilot in airport identification.

10-1-6-6. Positional Accuracy:
(1). Horizontal: maximum 20 feet
(2). Vertical: maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation

10-1-6-7. Data Capture Rule: Be sure that the attribute field for “landmarkType_d” correctly identifies the linear object being drawn. Each landmark type feature has its own data capture

rule. All top elevations must be collected at the highest point above ground level for each corresponding object.

(1). Roads: On a two-lane road, the centerline must be collected. For divided highways and interstates, the centerline of each opposing road direction must be collected.

(2). Railroads: The centerline between two parallel rails must be collected. For railroad yards, the centerline of each of the outer railroads must be collected.

(3). Shoreline: The line where land (and manmade structures) and water meet must be collected as a single polyline. The Shoreline attribute polyline represents the land/water interface. The beginning vertex and last vertex of the polyline must be coincident for small bodies of water (i.e. lakes, ponds, etc.) that are contained inside the OIS.

(a). When large bodies of water (i.e. oceans, lakes, rivers, etc.) continue outside the OIS, the Shoreline attribute polyline representing the land/water interface must be drawn. In addition, the Shoreline Feature Boundary attribute must be utilized to draw the back side of the shoreline coincident to the OIS or reasonable cutoff point to complete the polyline. The Shoreline Feature Boundary attribute is an imaginary line used to close the linear feature. In the case of a river, a reasonable cut off point may be drawn at the ends of the shoreline to complete the polyline.

(b). The beginning or end vertex of the Shoreline attribute polyline must be coincident with the beginning or end vertex of the Shoreline Feature Boundary attribute polyline in order to close the shoreline feature.

(4). Utility Lines: The center of the pole and/or tower must be located to indicate a corresponding utility line. A representative obstacle must be identified along the feature if it was collected for obstruction purposes.

(5). Levee: The highest points along the levee must be located. A representative obstacle must be identified along the feature if it was collected for obstruction purposes.

(6). Fence: The fence polyline must be located in the center of the corresponding fence line. A representative obstacle must be identified along the feature if it was collected for obstruction purposes.

(7). Quarries: A quarry determined to be of landmark value in geographic orientation must be collected along the outline (or outer edge) of each pit belonging to that quarry. The beginning vertex and last vertex of the polyline must be coincident.

(8). Non-AOC Related Runways: Specially prepared hard surface runways not associated with the AOC airport but that fall within the AOC OIS surfaces must be collected

along the outline of the runway. The beginning vertex and last vertex of the polyline must be coincident.

(9). Closed Runway: Closed AOC related runways that are sufficiently prominent to be of landmark value to a pilot must be collected along the outline of the runway. The beginning vertex and last vertex of the polyline must be coincident.

(10). Other: Any other linear feature used for geographic orientation must be collected along the outline (outer edge) of a closed linear feature or along the centerline of a linear feature. The beginning vertex and last vertex of the polyline must be coincident for closed linear features.

10-1-6-8. SDSFIE Equivalent: None

10-1-6-9. Required Element For: AOC

10-1-6-10. Attributes:

Attribute	**Description**
landmarksegment_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
name (String40)	Name of the feature
feat_desc (String255)	Description of the feature
landmarkType_d (Enumeration)	Type of landmark feature
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-1-7. Obstruction Area

10-1-7-1. Definition: Areas penetrating the plane of specified or supplemental obstruction identification surface (OIS). The type of obstructing area is determined by the predominantly obstructing element in the grouped area. Penetrating groups of trees, ground, buildings, urban areas, mobile cranes, and agricultural area are the most common types of area limits found within the surfaces of a 14 CFR Part 77 survey.

10-1-7-2. Geometry Type: 3D Polygon

10-1-7-3. Feature Group: Airfield

10-1-7-4. Sensitivity: Restricted

10-1-7-5. Requirements: Clusters of obstacles greater than approximately 1 acre (43,560 square feet) must be captured as individual polygon objects. The highest obstruction in each area limit and the highest obstruction in the approach and primary portion of each area limit must be determined and/or verified. Refer to Paragraph 16-5, Obstacle Selection, for more details.

10-1-7-6. Positional Accuracy:

(1). Horizontal: maximum 5 feet

(2). Vertical: maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation

10-1-7-7. SDSFIE Equivalent: airspace_obstruction_navaid_point

10-1-7-8. Data Capture Rule: The line where obstructing and non-obstructing obstacles meet must be collected as single polygon. The Shoreline attribute polyline represents the land/water interface. Each obstruction area must be collected according to its outline (or outer edge) when possible. The outline is where obstructing and non-obstructing obstacles meet. All elevations penetrating the OIS must be collected within the area.

10-1-7-9. Required Element For: AOC

10-1-7-10. Attributes:

Attribute	**Description**
air_obs_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
obs_number (String20)	An obstruction number, as shown on a map, which is assigned to the wavier, deviation, etc. [Source: SDSFIE Feature Table]
obs_typ_d (Enumeration)	Description of Obstruction Area type
name (String40)	Name of the feature
feat_desc (String255)	Description of the feature
oisSurfaceCondition_d (Enumeration)	The Obstruction Identification Surface that Obstructing Area represents
dispostn_d (String16)	The disposition of the airspace obstruction [Source: SDSFIE Feature Table]
faa_d (Boolean)	A Boolean indicating whether the obstruction has received FAA coordination or review [Source: SDSFIE Feature Table]
feat_ht (Real)	The overall height of the obstruction from the surface of the earth [Source: SDSFIE Feature Table]
feat_len (Real)	The overall length of the obstruction [Source: SDSFIE Feature Table]
feat_width (Real)	The overall width of the obstruction [Source:

	SDSFIE Feature Table]
frangibl_d (Boolean)	A Boolean indicating whether the obstruction is easily broken [Source: SDSFIE Feature Table]
narrative (String240)	A description or other unique information concerning the subject item, limited to 240 characters [Source: SDSFIE Feature Table]
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity an should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s)

10-1-8. Obstruction Identification Surface

10-1-8-1. Definition: A derived imaginary surface defined by FAA [Source: NGS]

10-1-8-2. Geometry Type: 3D Polygon

10-1-8-3. Feature Group: Airspace

10-1-8-4. Sensitivity: Restricted

10-1-8-5. Requirements: Identify the obstruction identification surface required by the utilization type for the runway.

10-1-8-6. Positional Accuracy:
(1). Horizontal: maximum 5 feet
(2). Vertical: maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation

10-1-8-7. SDSFIE Equivalent: airfield_imaginary_surface_area

10-1-8-8. Required Element For: AOC/ALP

10-1-8-9. Data Capture Rule: Depict the horizontal limits of the appropriate obstruction imaginary surface.

10-1-8-10. Attributes:

Attribute	**Description**
spc_zon_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a

	feature type.
zone_name (String30)	A commonly used name for the zone [Source: SDSFIE Feature Table]
feat_desc (String255)	Description of the feature
oisSurfaceType_d (Enumeration)	Surface Type refers to the general type of surface used to analyze features. Surfaces of the same type usually are similar in nature with respect to certain aspects of the surface definition or may merely be representative of different programs within the airport charting community.
oisZoneType_d (Enumeration)	Specifies zones within Obstruction Identification Surfaces (OIS)
oisSurfaceCondition_d (Enumeration)	The Obstruction Identification Surface that Obstructing Area represents
safety_reg (String20)	An identifier for the safety regulations in effect within the zone [Source: SDSFIE Feature Table]
zone_use (String50)	A description of the use of the zone [Source: SDSFIE Feature Table]
approachType_d (Enumeration)	Specific approach type used to analyze features. The approach types must be an approach of the general surface type specified in the AirportSurfaceType attribute.
grad_lo_hi (Real)	The low to high gradient within the airspace [Source: SDSFIE Feature Table]
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-1-9. Noise Contour

10-1-9-1. Definition: An area that describes the noise attributed to operations. For aircraft operations, the Day/Night average sound level (Ldn) descriptor is typically used to categorize noise levels. [Source: 14 CFR Part 150]

10-1-9-2. Geometry Type: 3D Polygon

10-1-9-3. Feature Group: Environmental

10-1-9-4. Sensitivity: Confidential

10-1-9-5. Requirements: None

10-1-9-6. Positional Accuracy:
(1). Horizontal: maximum 1 foot
(2). Vertical: maximum each vertex 5 feet with no position along line segment greater than 10 feet from its true elevation

10-1-9-7. SDSFIE Equivalent: noise_contour_line

10-1-9-8. Required Element For: ALP

10-1-9-9. Data Capture Rule: AS required to ensure accurate information.

10-1-9-10. Attributes:

Attribute	**Description**
noi_zon_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
contourValue (Real)	The decibel level of the contour line
zone_desc (String60)	A description for the noise zone [Source: SDSFIE Feature Table]
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-1-10. Runway Arresting Area

10-1-10-1. Definition: Any FAA-approved high energy absorbing material of a specific strength that will reliably and predictably bring an aircraft to a stop without imposing loads that exceed the aircraft’s design limits, cause major structural damage, or impose excessive force on its occupants. Currently, the only FAA- approved material is EMAS (Engineering Material Arresting System) [Source: AC 150/5220-22].

10-1-10-2. Geometry Type: 3D Polygon

10-1-10-3. Feature Group: Airfield

10-1-10-4. Sensitivity: Confidential

10-1-10-5. Requirements: None

10-1-10-6. Positional Accuracy:
(1). Horizontal: maximum 5 feet
(2). Vertical: maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation

10-1-10-7. SDSFIE Equivalent: airfield_linear_safety_feature_line

10-1-10-8. Required Element for: ALP

10-1-10-9. Data Capture Rule: As required to ensure appropriate accuracy.

10-1-10-10. Attributes:

Attribute	**Description**
safety_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
surfaceMaterial_d (Enumeration)	A code indicating the composition of the related surface [Source: NFDC]
feat_len (Real)	The overall length of the feature [Source: SDSFIE Feature Table]
feat_width (Real)	The overall width of the feature.
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-1-11. Runway Label

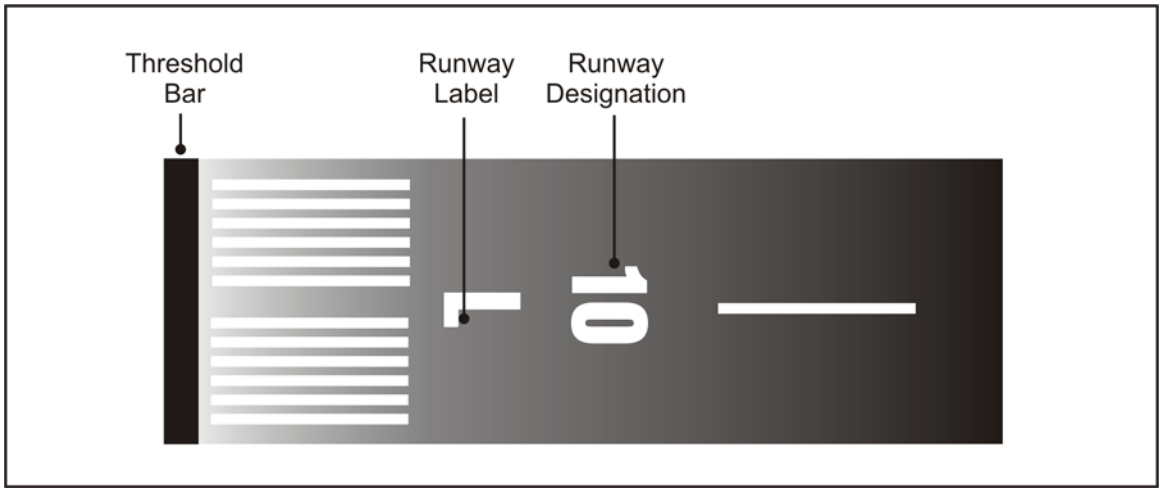

Figure 2-18: Illustrates the collection of the runway label

10-1-11-1. Definition: The bottom center position of the runway designation marking.

10-1-11-2. Geometry Type: 3D Point

10-1-11-3. Feature Group: Airfield

10-1-11-4. Sensitivity: Secret

10-1-11-5. Requirements: All runway labels must be collected as individual point objects and shown in their true locations as painted on the runway at the time of the field survey.

10-1-11-6. Positional Accuracy:
(1). Horizontal: maximum 5 feet
(2). Vertical: maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation

10-1-11-7. SDSFIE Equivalent: None

10-1-11-8. Required Element For: AOC

10-1-11-9. Data Capture Rule: A point located at the base of the true location of each painted runway number on the runway centerline must be captured for each end of a runway. If a runway number is not painted on the runway, a point on the runway number published in the U.S. Government flight information publication “U.S. Terminal Procedures” current at the time of the field survey must be determined at the base of the number approximately 100 feet from the threshold.

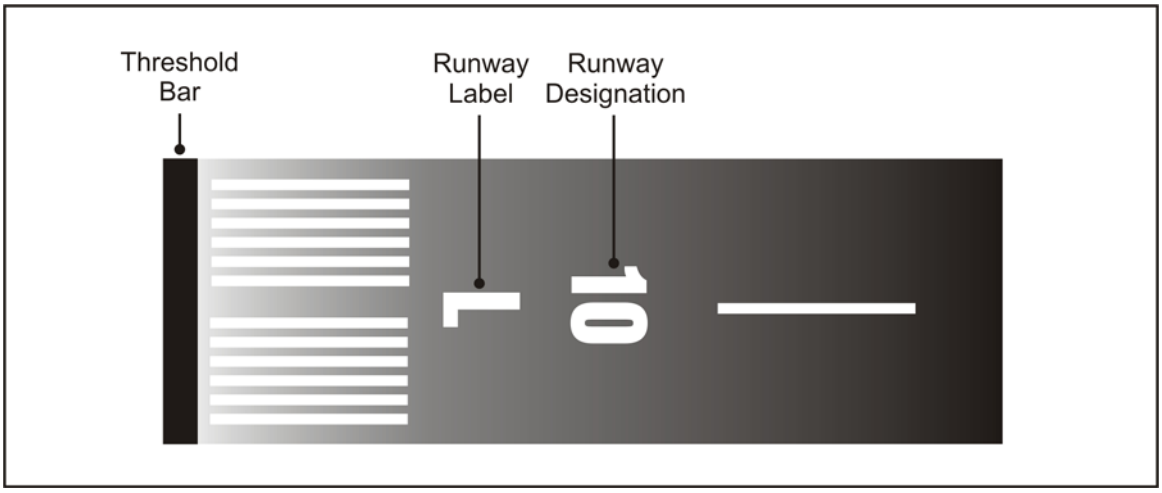

Figure 2-19: Illustrates the runway label for a parallel runway designation

10-1-11-10. Attributes:

Attribute	**Description**
runwaylabel_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
rwy_desg (String3)	The designator of the associated runway
feat_desc (String255)	Description of the feature
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-1-12. Taxiway Intersection

10-1-12-1. Definition: The point of intersection of taxiway guidance line markings or marking continuations where marking is uninterrupted (Source: D0-272); a junction of two or more taxiways (Source: ICAO Annex 14, Volume 1, Aerodromes, Chapter 1, page 5).

10-1-12-2. Geometry Type: 3D Point

10-1-12-3. Feature Group: Airfield

10-1-12-4. Sensitivity: Restricted

10-1-12-5. Requirements: All intersections of taxiway guidance markings on specially prepared hard surfaces associated with the project airport must be determined as individual point objects.

10-1-12-6. Positional Accuracy:

(1). Horizontal: maximum 5 feet
(2). Vertical: maximum 5 feet from its true elevation

10-1-12-7. SDSFIE Equivalent: None

10-1-12-8. Required Element For: ALP

10-1-12-9. Data Capture Rule: Capture the point where the taxiway guidance lines meet, intersect, or connect in some manner with the guidance lines of another taxiway.

10-1-12-10. Attributes:

Attribute	**Description**
pavementsection_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
name (String40)	Name of the feature
pavement_condition_index (Integer)	Pavement Classification Number Code [Source: SDSFIE Feature Table]
feat_desc (String255)	Description of the feature
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

11- 10-1-13. Taxiway Segment

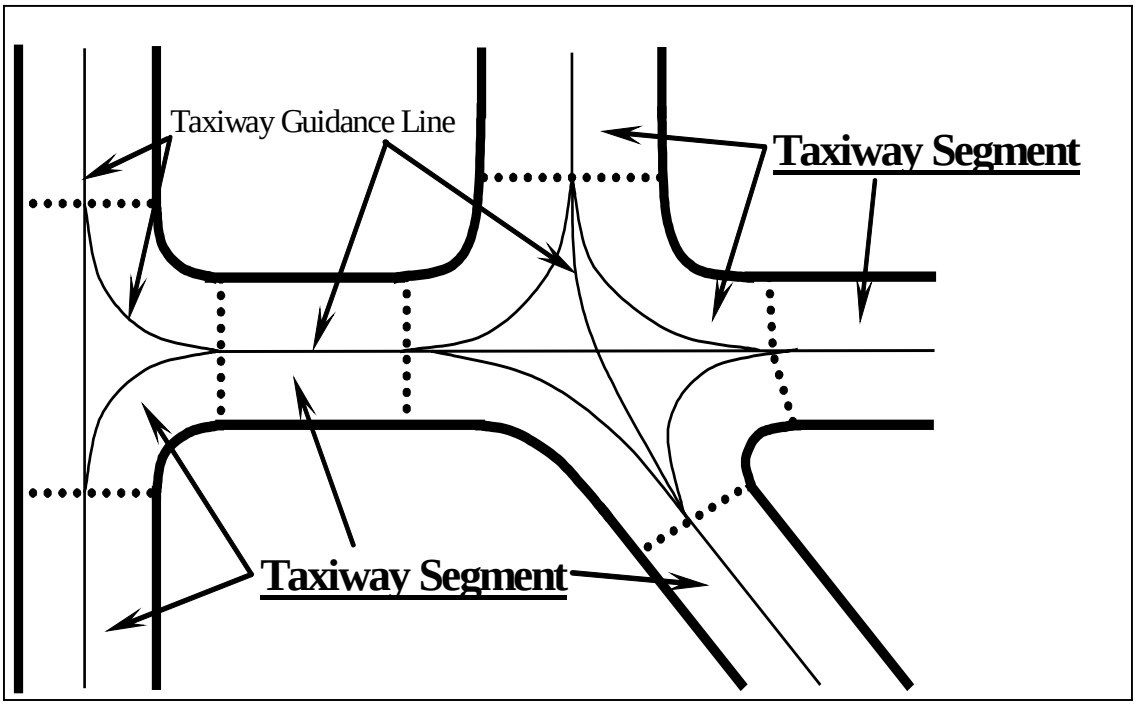

Figure 2-20: Illustrates the collection of a taxiway segment

10-1-13-1. Definition: Defined paths on an airport established for the taxiing of aircraft and intended to provide a link between one part of the airport and another. The taxiway segment feature is used for taxiways, apron taxiways, rapid exit taxiway, taxiway intersections, and aircraft stand taxilane surface.

10-1-13-2. Geometry Type: 3D Polygon

10-1-13-3. Feature Group: Airfield

10-1-13-4. Sensitivity: Restricted

10-1-13-5. Requirements: All taxiways with specially prepared hard surfaces associated with the project airport must be determined as individual polygon objects.

10-1-13-6. Positional Accuracy:

(1). Horizontal: maximum 5 feet

(2). Vertical: maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation

10-1-13-7. SDSFIE Equivalent: airfield_surface_site

10-1-13-8. Required Element For: ALP/AOC

10-1-13-9. Data Capture Rule: The taxiway segment features may consist of multiple polygons. The center of the yellow paint stripes along the outer edges of the taxiway must be collected as individual polygon objects. When there are no outer paint stripes, the outer edges of the taxiway pavement must be collected. Taxiway segments must not overlap. All taxiway segment polygons must be attached to the adjacent taxiway polygon by way of shared lines.

10-1-13-10. Attributes:

Attribute	**Description**
air_sur_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
taxi_desgn (String75)	Taxiway segment name. The name should be identical to the corresponding taxiway name. Multiple taxiway segments can have the same name. If two or more taxiways intersect the taxiway segment intersection will be named after the predominant taxiway. If two taxiways on the same level intersect, the segment can be named arbitrarily after one of the taxiways.
status_d (Enumeration)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
taxiwayType_d (Enumeration)	The type of taxiway
surfaceMaterial_d (Enumeration)	A code indicating the composition of the related surface [Source: NFDC]
feat_len (Real)	The overall length of the airfield surface [Source: SDSFIE Feature Table]
feat_width (Real)	The overall width of the airfield surface [Source: SDSFIE Feature Table]
designGroup_d (Enumeration)	A grouping of airplanes based on wingspan [Source: AC 150/5300-13]
wingspan (Real)	The quantity representing the maximum wingspan that can be accommodated by the airfield surface [Source: SDSFIE Feature Table]
directionality_d (Enumeration)	An indicator as to whether operations can be conducted in one or two directions
maxSpeed (Real)	The maximum speed permitted
pavementClassificationNumber	A number that expresses the relative load-carrying capacity of a pavement in terms of a standard single wheel load [Source: AC 150/5335-5]
surfaceCondition_d (Enumeration)	A description of the serviceability of the pavement [Source: NFDC]

user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-2. FIELD SURVEYED AND/OR REMOTELY SENSED FEATURES

The second category of features could be collected by either remote sensing or field survey methods. FAA recommends geospatial features required by these General Specifications be collected by remote sensing methods and then verified by field survey methods, but does not make this sequence mandatory. This sequence should contribute to more efficient and prompt deliverables.

10-2-1. Airport Sign

10-2-1-1. Definition: Signs at an airport other than surface painted signs. [Source: AC 150/5340-18]

10-2-1-2. Geometry Type: 3D Point

10-2-1-3. Feature Group: Airfield

10-2-1-4. Sensitivity: Restricted

10-2-1-5. Requirements: None

10-2-1-6. Positional Accuracy:
(1). Horizontal: maximum 3 feet
(2). Vertical: maximum each vertex 5 feet with no position along line segment greater than 10 feet from its true elevation

10-2-1-7. Data Capture Rules:
(1). Remote Sensing: As required to meet the required accuracy
(2). Field Survey: As required to meet the required accuracy

10-2-1-8. SDSFIE Equivalent: general_improvement_feature_point

10-2-1-9. Required Element For: ALP

10-2-1-10. Attributes:

Attribute	Description
feature_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
signTypeCode_d (Enumeration)	The type of sign
message (String254)	The text message that appears on the sign.
feat_desc (String60)	A description of the improvement feature [Source: SDSFIE Feature Table]
feat_ht (Real)	The overall height of the feature [Source: SDSFIE Feature Table]
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-2-2. Marking Line

10-2-2-1. Definition: An element of marking whose geometry is a line. [Source: AC 150/5340-1 and RTCA DO-272]

10-2-2-2. Geometry Type: 3D Line

10-2-2-3. Feature Group: Airfield

10-2-2-4. Sensitivity: Restricted

10-2-2-5. Requirements:None

10-2-2-6. Positional Accuracy:
(1). Horizontal: maximum 2 feet
(2). Vertical: maximum each vertex 5 feet with no position along line segment greater than 10 feet from its true elevation

10-2-2-7. Data Capture Rules:
(1). Remote Sensing: As required to meet accuracy
(2). Field Survey: As required to meet accuracy

10-2-2-8. SDSFIE Equivalent: airfield_surface_marking_line

10-2-2-9. Required Element For: ALP

10-2-2-10. Attributes:

Attribute	Description
mark_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
markingFeatureType_d	The type of the marking
color_d (Enumeration)	The color of the marking
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-2-3. Marking Area

10-2-3-1. Definition: An element of marking whose geometry is a polygon. [Source: AC 150/5340-1 and RTCA DO-272]

10-2-3-2. Geometry Type: 3D Polygon

10-2-3-3. Feature Group: Airfield

10-2-3-4. Sensitivity: Unclassified

10-2-3-5. Requirements: None

10-2-3-6. Positional Accuracy:
(1). Horizontal: maximum 2 feet
(2). Vertical: maximum each vertex 5 feet with no position along line segment greater than 10 feet from its true elevation

10-2-3-7. Data Capture Rules:
(1). Remote Sensing: As required to meet accuracy
(2). Field Survey: As required to meet accuracy

10-2-3-8. SDSFIE Equivalent: airfield_surface_marking_area

10-2-3-9. Required Element For: ALP

10-2-3-10. Attributes:

Attribute	Description
mark_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
markingFeatureType_d	The type of the marking
color_d (Enumeration)	The color of the marking
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-2-4. Movement Area

10-2-4-1. Definition: Runways, taxiways, and other areas of an airport which used for taxiing or hover taxiing, air taxiing, takeoff, and landing of aircraft, exclusive of loading ramps and aircraft parking areas [Source: 14 CFR Part 139]

10-2-4-2. Geometry Type: 3D Polygon

10-2-4-3. Feature Group: Airfield

10-2-4-4. Sensitivity: Unclassified

10-2-4-5. Requirements: None

10-2-4-6. Positional Accuracy:
(1). Horizontal: maximum 20 feet
(2). Vertical: maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation

10-2-4-7. Data Capture Rules:
(1). Remote Sensing: As required to meet accuracy
(2). Field Survey: As required to meet accuracy

10-2-4-8. SDSFIE Equivalent: airfield_surface_marking_area

10-2-4-9. Required Element For: ALP

10-2-4-10. Attributes:

Attribute	Description
featureID (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
Feature name (string30)	Name of the feature
feat_desc (string254)	Description of the feature
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-2-5. Runway BlastPad

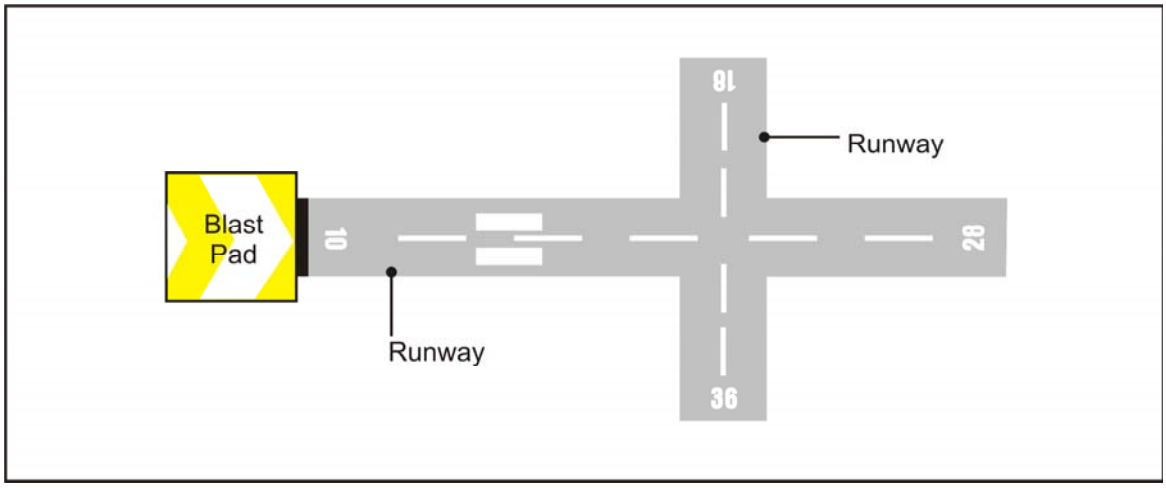

Figure 2-21: Illustrates the collection of a blast pad

10-2-5-1. Definition: A specially prepared surface placed adjacent to the end of a runway to eliminate the erosive effect of the high wind forces produced by airplanes at the beginning of their takeoff rolls.

10-2-5-2. Geometry Type: 3D Polygon

10-2-5-3. Feature Group: Airfield

10-2-5-4. Sensitivity: Restricted

10-2-5-5. Requirements: All paved areas beyond the runway ends that are classified as blast pad(s) must be determined as an individual polygon object. Blast pads must be collected by either remote sensing or field survey methods.

10-2-5-6. Positional Accuracy:

(1). Horizontal: maximum 5 feet

(2). Vertical: maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation

10-2-5-7. Data Capture Rules: Blast pads are typically adjacent to the runway end. The two methods of collection are described below.

(1). Remote Sensing: A blast pad must be attached to the adjacent runway or stopway by way of shared lines. If a painted line (threshold bar) separates the runway shoulder from the blast pad, the pavement beyond the painted line should be collected as part of the blast pad polygon.

(2). Field Survey: A point at the outer edge of the pavement on centerline end extended must be collected. The point will contain the longitude, latitude, and elevation for the blast pad end. The width of the blast pad must also be measured and entered into the data logger (ADCAT). Both point and measured width will be coincident to the outer edges of the pavement. An algorithm will calculate the position of the four corners of the blast pad based on the surveyed runway end point, the blast pad end point, and the measured width.

10-2-5-8. SDSFIE Equivalent: airfield_linear_safety_feature_line

10-2-5-9. Required Element For: AOC

10-2-5-10. Attributes:

Attribute	**Description**
surfaceType_d (Enumeration)	A classification of airfield pavement surfaces for Airport Obstruction Charts [Source: NGS]
feat_len (Real)	The overall length of the feature [Source: SDSFIE Feature Table]
status_d (Enumeration)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
pavementClassificationNumber	A number that expresses the relative load carrying capacity of a pavement in terms of a standard single wheel load [Source: AC 150/5335-5]
surfaceCondition_d (Enumeration)	A description of the serviceability of the pavement [Source: NFDC]
surfaceMaterial_d (Enumeration)	A code indicating the composition of the related surface [Source: NFDC]
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.

meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-2-6. Navaid Equipment

10-2-6-1. Definition: Any ground-based visual or electronic device providing point-to-point guidance information or position data to aircraft in flight.

10-2-6-2. Geometry Type: 3D Point

10-2-6-3. Feature Group: Navigational Aids

10-2-6-4. Sensitivity: Unclassified

10-2-6-5. Requirements: All navigational aids (NAVAIDs) associated with the project airport as described by Part 3, Chapter 15, Navigational Aids, will be determined as individual points. For purposes of the AOC, NAVAIDs are broken into two subtypes: electronic and visual. Both have specific rules for collection and verification. If any NAVAID is also an obstruction, the obstruction requirements also apply.

10-2-6-6. Positional Accuracy:
(1). Horizontal: Refer to Part 3, Chapter 15, Table 3-3
(2). Vertical: Refer to Part 3, Chapter 15, Table 3-3

10-2-6-7. Data Capture Rule: The data capture rules for the two subtypes of NAVAIDs are described below.
(1). Electronic NAVAIDs must be collected by field survey methods. Refer to Part 3, Paragraph 15-1, Electronic NAVAIDs, for data capture rules and accuracies.
(2). Visual NAVAIDs are also surveyed; however, they may be positioned by remote sensing methods if identified by some means other than field survey methods (i.e. Sketch, Photo-identified, etc.). The position of a representative point(s) must be determined for certain visual NAVAIDs. The representative position may be the center of the NAVAID or, when the NAVAID is composed of more than one unit, the center of the unit array may be the representative point. In the case of an approach light system, the first and last lights must be the representative points. Refer to Part 3, Section15-2, Visual NAVAIDs, for more details.

10-2-6-8. SDSFIE Equivalent: navigational_aid_point

10-2-6-9. Required Element For: AOC

10-2-6-10. Attributes:

Attribute	Description
faaLocID (Char4)	ID of the associated facility. Note that the Facility ID for NAVAIDs associated with an ILS/MLS references the associated ILS/MLS system identifier. [Source: NGS]
name (String40)	Name of the feature
narrative (String240)	A description or other unique information concerning the subject item, limited to 240 characters [Source: SDSFIE Feature Table]
navaidEquipTypeCode_d	Specifies the type of NAVAID [Source: NGS]
use_code_d (String16)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized [Source: SDSFIE Feature Table]
antToThreshDist (Integer)	The distance in feet that the antenna is from the runway threshold
centerlineDist (Integer)	NAVAID along centerline distances (distance between the NAVAID perpendicular point (PP) and the runway approach or stop-end, depending on the NAVAID type)
offsetDist (Integer)	The distance in feet that the feature is offset from the runway centerline.
lightingConfigType (Enumeration)	The configuration type of visual navigational aid systems (use only when NavaidEquipTypeCode_d is set to “Visual”)
latitude (Real)	Latitude in decimal degrees with negative numbers used for Western Hemisphere
longitude (Real)	Longitude in decimal degrees with negative numbers used for Western Hemisphere
status_d (Enumeration)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String75)	The owner of the facility
refElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point. [Source: NGS]
refEllipsoidHeight (Real)	The Base Ellipsoid Height for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point. [Source: NGS]

rwyEndID (String3)	The runway end associated with the NAVAID equipment (if any). This is the same as the runway identification number painted on the runway at the time of the survey.
downWindBarElev (Real)	
downWindBarThreshold (Real)	
refPointThreshold (Real)	Distance from the VGSI runway reference point to the threshold [Source: [FAA AAS-100]]
thresholdCrossHeight (Real)	
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s)

10-2-7. Obstacle

10-2-7-1. Definition: All fixed (whether temporary or permanent) and mobile objects, or parts thereof, that are located on an area intended for the surface movement of aircraft or that penetrate or represent the Obstruction Identification Surface.

10-2-7-2. Geometry Type: 3D Point

10-2-7-3. Feature Group: Airspace

10-2-7-4. Sensitivity: Restricted

10-2-7-5. Requirements: Details on required obstacles and related accuracies are found in Part 3, Paragraph 16-3, Obstacle Accuracies, and Part 3, Table 3-23, Obstacle Accuracies. NGS recommends that remote sensing methods be utilized to determine the required obstacles before performing the field survey. Field survey methods will then be used to verify or re-determine those obstacles that require more stringent accuracies. All field surveyed points should be verified by remote sensing to ensure correct position and elevation.

10-2-7-6. Positional Accuracy:
(1). Horizontal: refer to Part 3, Table 3-23, Obstacle Accuracies
(2). Vertical: refer to Part 3, Table 3-23, Obstacle Accuracies

10-2-7-7. Data Capture Rule: Obstacles in an OIS that require accuracies more stringent than 50 feet horizontally or 20 feet vertically must be field surveyed. The OISs that require less stringent accuracy requirements may be positioned by remote sensing methods. Refer to Part 3, Paragraph

16-3, Obstacle Accuracy, and Part 3, Table 3-23, Obstacle Accuracies, for more details on data capture rules and accuracies.

10-2-7-8. SDSFIE Equivalent: None

10-2-7-9. Required Element For: AOC

10-2-7-10. Attributes:

Attribute	Description
faaLocID (Char4)	ID of the associated facility. Note that the Facility ID for NAVAIDs associated with an ILS/MLS references the associated ILS/MLS system identifier. [Source: NGS]
name (String40)	Name of the feature
narrative (String240)	A description or other unique information concerning the subject item, limited to 240 characters [Source: SDSFIE Feature Table]
navaidEquipTypeCode_d	Specifies the type of NAVAID [Source: NGS]
use_code_d (String16)	The code that represents the airspace structure in which the aeronautical navigational aid is utilized [Source: SDSFIE Feature Table]
antToThreshDist (Integer)	The distance in feet that the antenna is from the runway threshold
centerlineDist (Integer)	NAVAID along centerline distances (distance between the NAVAID perpendicular point (PP) and the runway approach or stop-end, depending on the NAVAID type)
offsetDist (Integer)	The distance in feet that the feature is offset from the runway centerline
lightingConfigType (Enumeration)	The configuration type of visual navigational aid systems (use only when NavaidEquipTypeCode_d is set to 'Visual')
latitude (Real)	Latitude in decimal degrees with negative numbers used for Western Hemisphere
longitude (Real)	Longitude in decimal degrees with negative numbers used for Western Hemisphere
status_d (Enumeration)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
owner (String75)	The owner of the facility
refElevation (Real)	The Base Elevation for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase

	center of the reference point. [Source: NGS]
refEllipsoidHeight (Real)	The Base Ellipsoid Height for most NAVAIDs. For ILS DME, the elevation is the center of the antenna cover. For MLSAZ, MLSEL, and End Fire Type Glide Slope Antennas, the elevation is the phase center of the reference point. [Source: NGS]
rwyEndID (String3)	The runway end associated with the NAVAID equipment (if any). This is the same as the runway identification number painted on the runway at the time of the survey.
downWindBarElev (Real)	
downWindBarThreshold (Real)	
refPointThreshold (Real)	Distance from the VGSI runway reference point to the threshold [Source: [FAA AAS-100]]
thresholdCrossHeight (Real)	
highAngle (Real)	Maximum approach light vertical angle [Source: FAA AAS-100]
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-2-8. Restricted Access Boundary

10-2-8-1. Definition: A restricted area boundary defines aircraft movement area that is strictly reserved for use by authorized personnel only.

10-2-8-2. Geometry Type: 3D Line

10-2-8-3. Feature Group: Airfield

10-2-8-4. Sensitivity: Confidential

10-2-8-5. Requirements: Restricted Access Boundaries must be collected and included as individual line objects in the data set. The restricted access boundary features may consist of one or more lines. Each line represents the boundary between restricted and non-restricted aircraft movement areas.

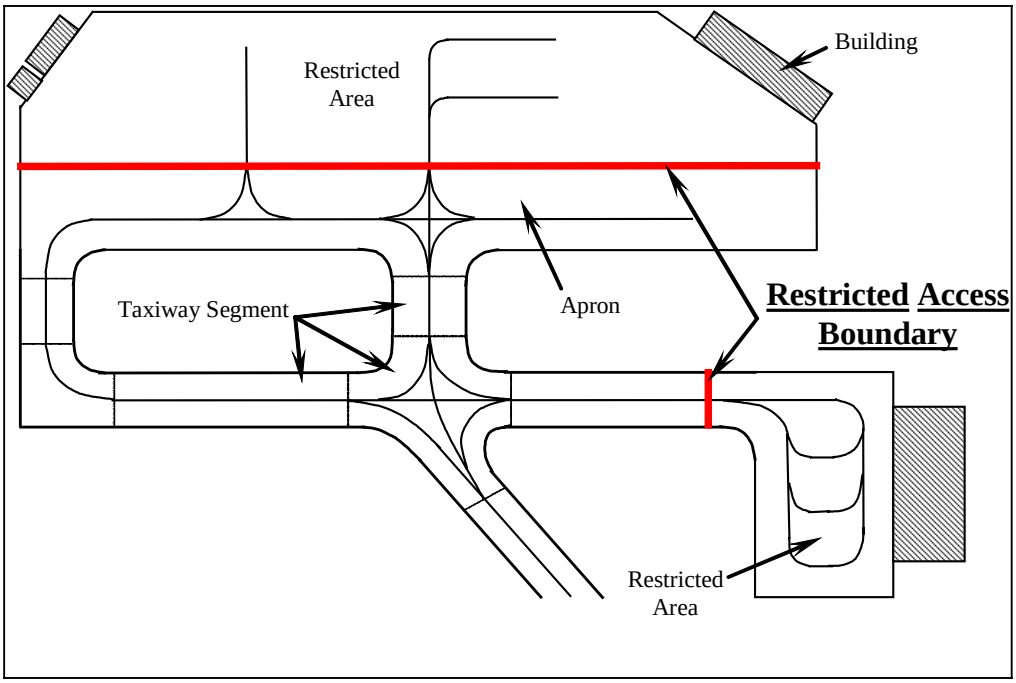

Figure 2-22: Illustrates the collection of a restricted area boundary

10-2-8-6. Positional Accuracy:

(1). Horizontal: maximum 5 feet

(2). Vertical: maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation

10-2-8-7. Data Capture Rule: Restricted areas are demarcated by a gate or a painted red line, which may extend across a taxiway or along an apron. The center of the gate or red line will be used to capture the restricted access boundary limit.

10-2-8-8. SDSFIE Equivalent: military_restricted_access_area

10-2-8-9. Required Element For: AOC

10-2-8-10. Attributes:

Attribute	Description
area_name (String30)	A common name for the restricted area [Source: SDSFIE Feature Table]
area_desc (String254)	A description of the restricted area [Source: SDSFIE Feature Table]
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.

meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-3. FIELD SURVEYED FEATURES

This category of airport features are those that must be field surveyed using the FAA-approved Aeronautical Data Collection and Analysis Tool (ADCAT). Features that require more stringent accuracies or those that cannot be detected by remote sensing must be collected using field survey methods. These features should be verified by remote sensing methods after they have been collected by ADCAT for the quality control analysis.

10-3-1. Airport Boundary

10-3-1-1. Definition: A polygon, or a set of polygons, that encompasses all property owned or controlled by the airport for aviation purposes. [Source: AC 150/5300-13, Appendix 7, Order 5190.6A, Section 5]

10-3-1-2. Geometry Type: Polygon

10-3-1-3. Feature Group: Airfield

10-3-1-4. Sensitivity: Restricted

10-3-1-5. Requirements: None

10-3-1-6. Positional Accuracy: As required by other State or National standards for this type of data.

10-3-1-7. Data Capture Rule: None

10-3-1-8. SDSFIE Equivalent: airfield_area

10-3-1-9. Required Element For: ALP

10-3-1-10. Attributes:

Attribute	Description
airfld_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
faaSiteNr (String8)	This is a number that contains a one-letter suffix. The number is assigned to the airport in ascending order, depending on the state and the associated city. The number is stored in a computer for the purpose of producing computer reports of airports in alphabetical order by state and associated city. The suffix indicates the primary use of the facility.

	Valid suffixes include: A = Airport, B = Balloonport, C = Seaplane Base, G = Gliderport, H = Heliport, S = Stolport, and U = Ultralight Flightpark [Source: FAA AC 150/5200-35]
faaLocID (Char4)	The location identifier assigned to the feature by FAA
iataCode (String4)	The location identifier assigned to the feature by International Air Transport Association (IATA)
icaoCode (String4)	The location identifier assigned to the feature by the ICAO
feat_name (String50)	The name of the airfield [Source: SDSFIE Feature Table]
feat_desc (String255)	Description of the feature
airportFacilityType_d (Enumeration)	The type of airfield
operationsType_d (Enumeration)	The type of operations permitted on the airfield
owner_d (Enumeration)	The type of owner of the airfield
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-3-2. Airport Control Point

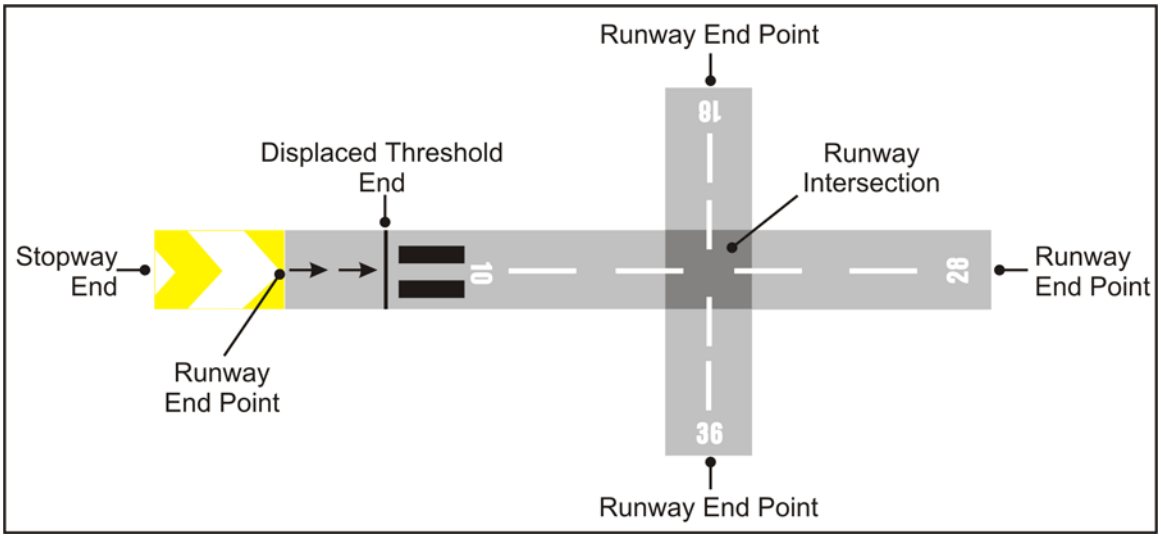

Fig 2-23: Illustrates the collection of a runway point

10-3-2-1. Definition: Points located on the straight line between the runway end points. This feature is used for Displaced Thresholds, Runway Intersections, Airport Elevation, Point Abeam Certain Offset NAVAIDs, Stopway Ends, Supplemental Profile Points, and the Touchdown Zone Elevation (TDZE).

10-3-2-2. Geometry Type: 3D Point

10-3-2-3. Feature Group: Geotechnical

10-3-2-4. Sensitivity: Restricted

10-3-2-5. Requirements: Refer to Part 3, Paragraph 13-3, Tables 3-1 and 3-2 and Figure 3-2, for required runway/stopway data.

10-3-2-6. Positional Accuracy: Varies based on type of point.

(1). Refer to Part 3, Paragraph 13-3, Tables 3-1 and3-2 and Figure 3-2, for required runway/stopway data.

(2). Refer to Part 3, Table 3-3, for NAVAID accuracy information data.

10-3-2-7. Data Capture Rule: A direct field survey of the runway end, displaced threshold ends, stopway ends, and supplemental profile points ensures accurate positioning of those runway points. Refer to Part 3, Chapter 3, Runway and Stopway Points. An algorithm within the ADCAT calculates the position of the other supplemental profile points along the centerline of the runway based on the surveyed runway/displaced threshold end points along with profile points obtained through GPS and/or conventional leveling techniques. A supplemental profile point is a runway/stopway point selected so a straight line between any two adjacent published runway/stopway points will be no greater than 1 foot vertical from the runway/stopway surface.

10-3-2-8. SDSFIE Equivalent: control_point

10-3-2-9. Required Element For: AOC

10-3-2-10. Attributes:

Attribute	**Description**
monumnt_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
permanentId (String6)	Permanent point identifier assigned by NGS to PACS and SACS [Source: NGS]
pointType_d (Enumeration)	Contains the allowable values of a point type used by the ControlPoint feature. The point types may be supplementally provided as subtypes of ControlPoints for ease of use and clarification.
feat_name (String50)	Any commonly used name for the control point. [Source: SDSFIE Feature Table]
mon_typ_d (String16)	The type of monument as defined by the Corps of Engineers EM 110-1-1002. [Source: SDSFIE Feature Table]
mon_desc (String254)	The monument description. [Source: SDSFIE Feature Table]
elevation (Real)	Elevation of the point relative to the selected vertical datum. [Source: NGS]
ellipsoidElevation (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Also called the geodetic height. [Source: NGS]
latitude (Real)	Latitude in decimal degrees with negative numbers used for Western Hemisphere
longitude (Real)	Longitude in decimal degrees with negative numbers used for Western Hemisphere
yearOfSurvey (Integer)	The year of the most recent runway end survey used to compute the ARP
date_recov (Date)	The date the monument was last field recovered. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915). [Source: SDSFIE Feature Table]
recov_cond (String30)	The condition and type of the marker (witness post) used to identify the location

	of the monument. [Source: SDSFIE Feature Table]
fld_book (String254)	The field book. [Source: SDSFIE Feature Table]
gps_suit_d (Boolean)	A Boolean indicating GPS suitability. [Source: SDSFIE Feature Table]
spcszone_d (String16)	The State Plane Coordinate System Code. [Source: SDSFIE Feature Table]
stmpd_desg (String50)	The designation stamped into the bottom of the monument. [Source: SDSFIE Feature Table]
epoch (String10)	Survey epoch used to establish the control point. [Source: SDSFIE Feature Table]
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-3-3. Airport Parcel

10-3-3-1. Definition: A tract of land within the airport boundary that was acquired from surplus property, Federal funds, local funds, etc. Easement interests in areas outside the fee property line should also be included as an airport parcel. [Source AC 150/5300-13, Appendix 7; FAA Order 5190.6, Chapter 5]

10-3-3-1. Geometry Type: Polygon

10-3-3-1. Feature Group: Cadastral

10-3-3-1. Sensitivity: Restricted

10-3-3-1. Requirements: None

10-3-3-1. Positional Accuracy: As required by other State or national standards for this type of data.

10-3-3-1. Data Capture Rule: None

10-3-3-1. SDSFIE Equivalent: None

10-3-3-1. Required Element For: ALP

10-3-3-1. Attributes:

Attribute	Description
airportparcel_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
authority (String75)	The owner of the airport parcel
name (String40)	Name of the feature
feat_desc (String255)	Description of the feature
acquisitionType (String20)	The type of acquisition used to acquire the parcel
costToAcquire (Real)	The amount paid to the owner in U.S. dollars for the parcel
dateAcquired (Date)	The date the parcel was acquired. Format for date is YYYYMMDD (i.e. September 15, 1994 = 19940915).
grantProjectNumber (String30)	The grant number if Federal funds were used to acquire the parcel
howAcquired (String50)	The manner in which the parcel was acquired
landUse (String20)	The land use of the parcel when it was acquired
marketValue (Real)	The assessed market value of the parcel in U.S. dollars when it was acquired
yearAssessed (Date)	The year in which the market value assessment was made
yearBuilt (Date)	The year in which the most recent structure(s) were built on the parcel
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-3-4. Clearway

10-3-4-1. Definition: An area beyond the takeoff runway under control of airport authorities within which terrain or fixed obstacles may not extend above specified limits. These areas may be required for certain turbine-powered operations, and the size and upward slope of the clearway will differ depending on when the aircraft was certificated.

10-3-4-2. Geometry Type: Polygon

10-3-4-3. Feature Group: Airspace

10-3-4-4. Sensitivity: Restricted

10-3-4-5. Requirements: None

10-3-4-6. Positional Accuracy: None

10-3-4-7. Data Capture Rule: Refer to Appendix 2, Section 2-4, Runway End, Stopway End, and Displaced Threshold Identification, for identifying and properly positioning the clearway. The width of the clearway must be measured from the outer edge of the clearway and entered into the ADCAT. An algorithm within the ADCAT calculates the position of the four corners of the clearway based on the surveyed runway and clearway end points along with a measured width.

10-3-4-8. SDSFIE Equivalent: None

10-3-4-9. Required Element For: AOC/ALP

10-3-4-10. Attributes

Attribute	**Description**
clearwayLength (Integer)	The length of clearway as reported by the FAA Airport/Facility Directory and the Aeronautical Information Publication (AIP) for international airports
featureID (Integer)	A unique feature identifier, usually a sequence number from database (persistence)
Name (String)	Name of the feature
Description (String)	Description of the feature
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-3-5. Displaced Threshold

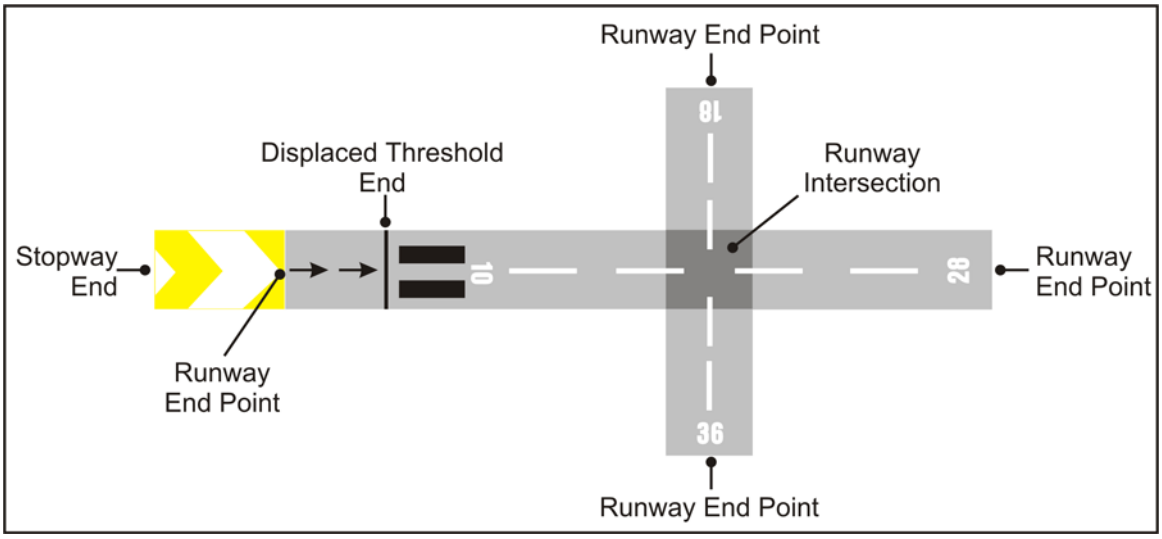

Fig 2-24: Illustrates the collection of a runway point

10-3-5-1. Definition: The beginning of that portion of the runway available for landing when it is located at a point other than the physical end of the runway.

10-3-5-2. Geometry Type: Point

10-3-5-3. Feature Group: Airfield

10-3-5-4. Sensitivity: Restricted

10-3-5-5. Requirements: The centerline position of a displaced threshold must be collected by GPS survey methods. The position and elevation must be entered into the data logger (ADCAT).

10-3-5-6. Positional Accuracy: Refer to Chapter 3, Tables 3-1 and 3-2.

10-3-5-7. Data Capture Rule: Refer to Appendix 2, Section 2-4, Runway End, Stopway End, and Displaced Threshold Identification, for identifying and properly positioning displaced thresholds.

10-3-5-8. SDSFIE Equivalent: None

10-3-5-9. Required Element For: AOC/ALP

10-3-5-10. Attributes:

Attribute	Description
displacedthreshold_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.

pointType_d (Enumeration)	Contains the allowable values of a point type used by the ControlPoint feature. The point types may be supplementally provided as subtypes of ControlPoints for ease of use and clarification.
elevation (Real)	Elevation of the point relative to the selected vertical datum [Source: NGS]
ellipsoidElevation (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Also called the geodetic height. [Source: NGS]
latitude (Real)	Latitude in decimal degrees with negative numbers used for Western Hemisphere
longitude (Real)	Longitude in decimal degrees with negative numbers used for Western Hemisphere
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-3-6. NAVAID Site

10-3-6-1. Definition: The parcel, lease, or right-of-way boundary for a NAVAID or facility that is located off airport property.

10-3-6-2. Geometry Type: 3D Polygon

10-3-6-3. Feature Group: Navigational Aids

10-3-6-4. Sensitivity: Unclassified

10-3-6-5. Requirements: None

10-3-6-6. Positional Accuracy: As required by local, State, or national standards for this type of data.

10-3-6-7. Data Capture Rule: As required to meet accuracy.

10-3-6-8. SDSFIE Equivalent: airfield_facility_surface_site

10-3-6-9. Required Element For: ALP

10-3-6-10. Attributes:

Attribute	Description
navaidsite_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
faaLocID (Char4)	The location identifier assigned to the feature by FAA
fac_typ_d (String16)	The type of facility or feature related to airfield operations [Source: SDSFIE Feature Table]
facil_desc (String60)	A brief description of the facility and any special characteristics [Source: SDSFIE Feature Table]
PropertyCustodian (String50)	The regional property management office responsible for ownership of the site
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-3-7. Runway

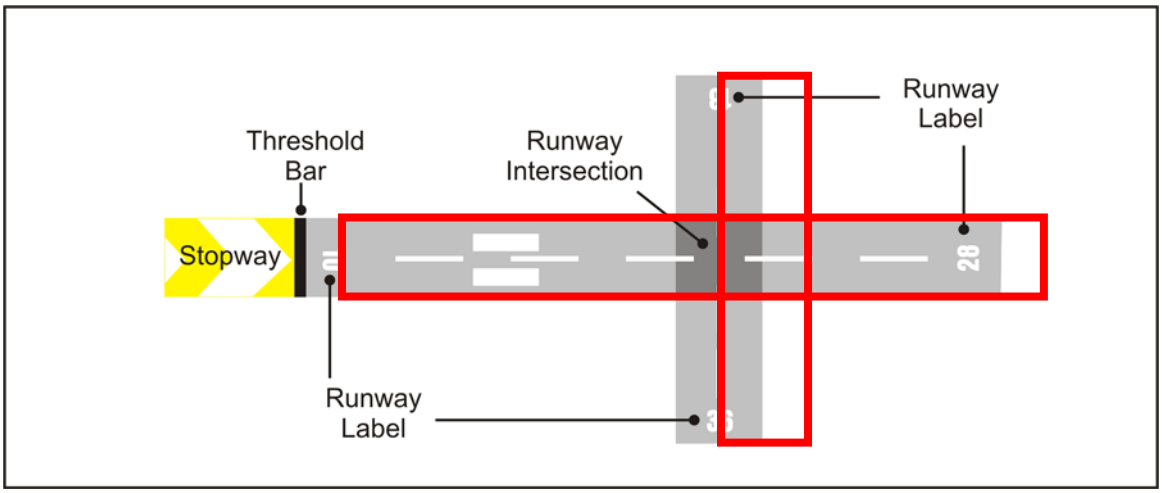

Figure 2-25: The red lines encompassing the runway illustrate the collection of the runways at an airport

10-3-7-1. Definition: A defined rectangular area on an airport prepared for the landing and takeoff of aircraft.

10-3-7-2. Geometry Type: 3D Polygon

10-3-7-3. Feature Group: Airfield

10-3-7-4. Sensitivity: Restricted

10-3-7-5. Requirements: The width and centerline ends of each runway must be collected by field survey methods. Refer to Part 3, Paragraph 13-2, Runway Length and Width, for more details.

10-3-7-6. Positional Accuracy: Refer to Part 3, Tables 3-1 and 3-2.

10-3-7-7. Data Capture Rule: In addition to the requirements for runway end collection described in Part 3, Paragraph 13-2, the width of the runway must be measured from the outer edge of the runway edge painting, excluding runway shoulders or stopways, and entered into the ADCAT. If there are no painted runway edge markings, then the narrowest section of runway measured should be reported as the runway width. An algorithm within the ADCAT will calculate the position of the four corners of the runway based on the surveyed runway end points and the measured width.

10-3-7-8. SDSFIE Equivalent: airfield_surface_site

10-3-7-9. Required Element For: ALP/AOC

10-3-7-10. Attributes:

Attribute	**Description**
runway_num (String7)	Designator of the runway based on the magnetic bearing and position in relation to parallel runways (e.g. 33R/15L) [Source: AC 150/5340-1]
surfaceType_d (Enumeration)	A classification of airfield pavement surfaces for Airport Obstruction Charts [Source: NGS]
status_d (Enumeration)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
feat_len (Real)	The straight line distance between runway end points. This line does not account for surface undulations between points. Official runway lengths are normally computed from runway end coordinates and elevations. [Source: FAA Specification 405]
feat_width (Real)	A perpendicular line to the surface centerline, extending to the edge of the runway pavement on both sides of the runway, through a runway end-point. If the runway width is less than 100 feet, the width is rounded up to the nearest 5 feet. If the runway width is more than 100 feet, the width is rounded to the nearest 10 feet. If the rounded width is different from the published width, NGS should be contacted for further advice. [Source: NGS]
pavementClassificationNumber	A number that expresses the relative load carrying capacity of a pavement in terms of a standard single wheel load [Source: AC 150/5335-5]

surfaceCondition_d (Enumeration)	A description of the serviceability of the pavement [Source: NFDC]
surfaceMaterial_d (Enumeration)	A code indicating the composition of the related surface [Source: NFDC]
feat_desc (String255)	Description of the feature
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-3-8. Runway End

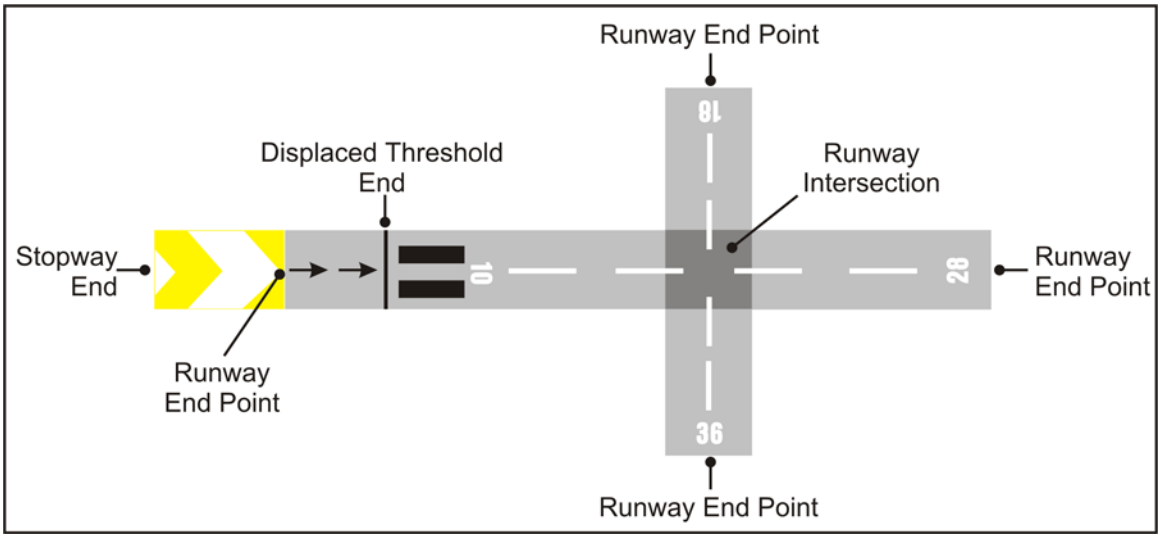

Figure 2-26: The dot illustrates the collection of the runway end

10-3-8-1. Definition: The end of the runway surface suitable for landing or takeoff runs of aircraft. Runway Ends are related to and describe the approach and departure procedure characteristics of a runway threshold. Runway End is the same as the runway threshold when the threshold is not displaced.

10-3-8-2. Geometry Type: 3D Point

10-3-8-3. Feature Group: Airfield

10-3-8-4. Sensitivity: Restricted

10-3-8-5. Requirements: The centerline ends of a runway marking the runway threshold must be collected by GPS survey methods. The positions and elevations must be entered into the data logger (ADCAT).

10-3-8-6. Positional Accuracy: Refer to Chapter 3 Tables 3-1 and 3-2.

10-3-8-7. Data Capture Rule: Refer to Appendix 2, Section 2-4, Runway End, Stopway End, and Displaced Threshold Identification, for identifying and properly positioning runway ends.

10-3-8-8. SDSFIE Equivalent: airfield_surface_site

10-3-8-9. Required Element For: ALP/AOC

10-3-8-10. Attributes:

Attribute	**Description**
name (String40)	Name of the feature
feat_desc (String255)	Description of the feature
status_d (Enumeration)	The predominant status of the airfield facility surface site [Source: SDSFIE Feature Table]
approachCat_d (Enumeration)	A grouping of aircraft based on 1.3 times their stall speed in the landing configuration at the certificated maximum flap setting and maximum landing weight at standard atmospheric conditions [Source: AC 150/5300-13]
precisionApproachGuidance_d	
elevation (Real)	Elevation of the point relative to the selected vertical datum [Source: NGS]
ellipsoidElevation (Real)	The height above the reference ellipsoid, measured along the ellipsoidal outer normal through the point in question. Also called the geodetic height. [Source: NGS]
asDistAvail (Real)	Accelerate Stop Distance Available (ASDA): The runway plus stopway length declared available and suitable for the acceleration and deceleration of an airplane aborting a takeoff [Source: AC 150/5300-13]
brngMagnetic (Real)	Magnetic runway bearing corresponding to threshold location valid at the day of data generation [Source: RTCA DO-272]
brngTrue (Real)	True bearing corresponding to the landing direction [Source: ICAO Annex 14]
designGroup_d (Enumeration)	A grouping of airplanes based on wingspan [Source: AC 150/5300-13]
displacedDist (Integer)	The distance from the runway end to the landing threshold. When the thresholdType is normal

	threshold. When the thresholdType is normal, displacedDist = 0.
landingDistAvail (Real)	Landing Distance Available (LDA): The runway length declared available and suitable for a landing airplane [Source: AC 150/5300-13]
latitude (Real)	Latitude in decimal degrees with negative numbers used for Western Hemisphere
longitude (Real)	Longitude in decimal degrees with negative numbers used for Western Hemisphere
RunwayEndDesg (String3)	The designator for the runway end (i.e. 32L)
rwySlope (Real)	Runway slope corresponding to landing direction [Source: RTCA DO-272]
takeOffDistAvail (Real)	Take-off Distance Available (TODA): The TORA plus the length of any remaining runway clearway beyond the far end of the TORA [Source: AC 150/5300-13]
takeOffRunAvail (Real)	Take-off Run Available (TORA): The runway length declared available and suitable for the ground run of an airplane taking off [Source: AC 150/5300-13]
tdzElevation (Real)	The highest elevation in the Touchdown Zone. The Touchdown Zone is the first 3,000 feet of the runway beginning at the threshold. [Source: FAA Specification 405]
tdzSlope (Real)	The longitudinal slope of the first 3000 feet of the runway beginning at the threshold [Source: FAA Specification 405]
thresholdType_d (Enumeration)	A description of the landing threshold: either normal or displaced
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-3-9. Runway Safety Area Boundary

10-3-9-1. Definition: The boundary of the Runway Safety Area (RSA) for which the Airport Authority has maintenance responsibility.

10-3-9-2. Geometry Type: Polygon

10-3-9-3. Feature Group:Unassigned

10-3-9-4. Sensitivity: Unclassified

10-3-9-5. Requirements: None

10-3-9-6. Positional Accuracy:
(1). Horizontal: 10 feet
(2). Vertical: maximum each vertex 10 feet with no position along line segment greater than 20 feet from its true elevation

10-3-9-7. Data Capture Rule: A Runway Safety Area Boundary must be collected as a single polygon.

10-3-9-8. SDSFIE Equivalent: None

10-3-9-9. Required Element For: ALP

10-3-9-10. Attributes:

Attribute	Description
Determination (string)	A formal declaration of the RSA condition with respect to standards and any requirement improvements
determinationDate (Date)	The date the RSA determination was approved
featureID (integer)	A unique feature identifier, usually a sequence number from database (persistence)
Name (String)	Name of the feature
Description (string)	Description of the feature
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-3-10. Shoulder

10-3-10-1. Definition: An area adjacent to the edge of paved runways, taxiways, or aprons providing a transition between the pavement and the adjacent surface; support for aircraft running off the pavement, enhance drainage, and blast protection. [Source: AC 150/5300-13]

10-3-10-2. Geometry Type: 3D Polygon

10-3-10-3. Feature Group: Airfield

10-3-10-4. Sensitivity: Restricted

10-3-10-5. Requirements: None

10-3-10-6. Positional Accuracy:
(1). Horizontal: 5 feet
(2). Vertical: maximum each vertex 5 feet with no position along line segment greater than 10 feet from its true elevation

10-3-10-7. Data Capture Rule: A Shoulder may consist of multiple polygons. When there are no painted ground markings, the outer edges of the area designated as shoulder must be collected.

10-3-10-8. SDSFIE Equivalent: airfield_surface_site

10-3-10-9. Required Element For: ALP

10-3-10-10. Attributes:

Attribute	**Description**
air_sur_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
shl_type_d (String20)	Code for whether this is a runway shoulder or taxiway shoulder [Source: SDSFIE Attribute Table]
surfaceMaterial_d (Enumeration)	A code indicating the composition of the related surface [Source: NFDC]
feat_width (Real)	The overall width of the airfield surface [Source: SDSFIE Feature Table]
feat_len (Real)	The overall length of the airfield surface [Source: SDSFIE Attribute Table]
status_d (Enumeration)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
restricted (Boolean)	An indicator as to whether access to the feature is restricted
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-3-11. Stopway

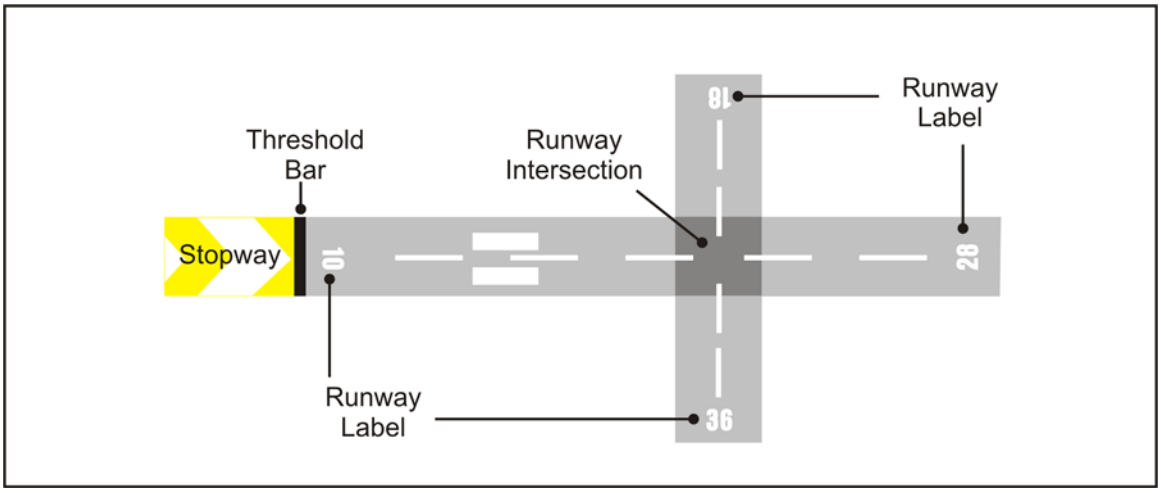

Figure 2-27: Illustrates the collection of the stopway

10-3-11-1. Definition: An area beyond the takeoff runway, no less wide than the runway and centered upon the extended centerline of the runway, able to support the airplane during an aborted takeoff without causing structural damage to the airplane. It is designated by the airport authorities for use in decelerating the airplane during an aborted takeoff.

10-3-11-2. Geometry Type: 3D Polygon

10-3-11-3. Feature Group: Airfield

10-3-11-4. Sensitivity: Restricted

10-3-11-5. Requirements: The width and centerline end of each stopway must be collected by field survey methods.

10-3-11-6. Positional Accuracy: Refer to Part 3, Tables 3-1 and 3-2.

10-3-11-7. Data Capture Rule: Refer to Appendix 2, Section 2-4, Runway End, Stopway End, and Displaced Threshold Identification, for identifying and properly positioning the stopway end. The width of the stopway must be measured from the outer edge of the yellow painted chevrons and entered into the ADCAT. An algorithm within the ADCAT calculates the position of the four corners of the stopway based on the surveyed runway and stopway end points along with a measured width.

10-3-11-8. SDSFIE Equivalent: None

10-3-11-9. Required Element For: AOC

10-3-11-10. Attributes:

Attribute	Description
stopway_id (Number*)	Primary Key. A globally unique identifier assigned to the instance of a feature type.
status_d (Enumeration)	A temporal description of the operational status of the feature. This attribute is used to describe real-time status.
feat_len (Real)	The length of the designated stopway from the end of the runway
feat_width (Real)	The overall width of the feature
surfaceMaterial_d (Enumeration)	A code indicating the composition of the related surface [Source: NFDC]
surfaceType_d (Enumeration)	A classification of airfield pavement surfaces for Airport Obstruction Charts [Source: NGS]
user_flag (String254)	An operator-defined work area. This attribute can be used by the operator for user-defined system processes. It does not affect the subject item's data integrity and should not be used to store the subject item's data.
meta_id (Integer20)	Foreign Key. Used to link the record to the applicable feature level metadata record(s).

10-4. UNSPECIFIED COLLECTION METHODOLOGY

10-4-1. The elevation of the Air Traffic Control Tower (ATCT) cab must be determined for each operational ATCT on the airport. The “Cab Floor” refers to the operating cab of the ATCT, which is usually the top floor in the tower. This is the level where the air traffic controllers use air/ground communications, visual signaling, and other devises to provide air traffic control services to aircraft operating in the vicinity of an airport or on the movement area. This elevation may be measured with trigonometric levels, tape measure, etc. Note there is no position determination or specific spot.

10-4-2. Airport Reference Point. The Airport Reference Point is computed based on the ultimate locations of the runways. Refer to Airport Control Point feature for requirements. Compute the Airport Reference Point according to Appendix 2, Section 2-1, of this AC.